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A Method OF WOUND TREATMENT

BY THE INTRODUCTION OF LIVING CULTURES OF A SPORE-BEARING ANAEROBE OF THE PROTEOLYTIC GROUP.

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(*Report to the Medical Research Committee.*)

AT the outset of this paper we wish to emphasise the fact that it is strictly of the nature of a preliminary communication, which does not embrace all the work we have done or are doing in this particular line of investigation. We furnish, however, the principles underlying this form of wound treatment, and are conscious that improvements in its method of application or modifications of certain theoretical statements in connexion therewith may later be found necessary.

Our excuse, and a valid one, we trust, for putting forward the result of our investigations at this stage is the urgency of the situation, and while much of the detail remains to be worked out, the method here described can be made use of *now* in the treatment of wound infections. The subsidiary questions arising from it are being worked out at leisure, but owing to pressure of routine work the results are not yet ready for incorporation in this paper. As, however, we believe the main principle to be sound and the need for its recognition and practical application to exist now in an acute form, we venture to hand on the main results we have arrived at so far.

METHODS OF WOUND TREATMENT.

The problem of the best method of wound treatment after three years of experience in the theatre of war is still unsolved. That which will be most conservative of human life and limb, which will curtail the convalescence of the wounded man, which is easy of application, and at the same time requires least attention, will surely be acclaimed the best method of treatment. At the outset of war treatment by antiseptics was the general rule, but it was soon recognised that ordinary antiseptic methods of pre-war-time days were futile in attempting to combat the gross infections of these wounds. At this juncture Sir Almroth Wright came forward as the opponent of antiseptic treatment and proposed the so-called "physiological treatment" by means of hypertonic saline solutions. We are not concerned here, however, with the question of antiseptics *versus* saline, or with any attempt to find fault with the method of treatment recommended by Sir Almroth Wright. In our opinion, the chief merit of Wright's work lies in the fact that he helped to break the spell which had bound surgeons to antiseptics and called attention to ordinary salt as an alternative method. Out of this method another was evolved which in turn has led to the new method which we put forward in this paper. Colonel H. M. W. Gray, C.B., basing his theories of treatment on those formulated by Wright, introduced, in order to promote a so-called lymphagogue action and to obviate the need for elaborate drainage or continuous irrigation, the method of treatment by salt packs. Briefly put, the merit of the salt pack lies in the ease with which it can be applied, in the fact that it can be left *in situ* for five or six days without requiring renewal, with all the advantages this carries with it to the patient, and in the fact, according to its inventors, that it effects more or less closely the changes which Wright insists upon are necessary for the rapid and successful cleansing of a wound from infection. Whether or not the salt acts physically, as Wright and his followers believe, we do not propose to discuss now, although on the lines of their explanation there is much that requires further elucidation. Suffice it to say that according to them the salt acts in the first instance as a lymphagogue, so preventing a wound becoming what Wright calls "lymph-bound"; that the lymph flow tends to loosen sloughs so that they come away more readily; that later the salt solution of reduced tonicity has a chemio-tactic influence on the leucocytes which together with the salt present complete the victory over the invading bacteria.

Results of Treatment with Salt Pack.

Of all the methods of wound treatment in use, one of us (L. J.) early became a convert to the salt-pack method, with results which were in the majority of cases all that could be desired, and which coincide with the published results obtained by all those who have given this method of treatment a fair trial. The adoption of this method has considerably curtailed the patient's period of convalescence, and has, moreover, succeeded where other methods have failed, including the much-advocated Carrel-Dakin procedure.

The wounds were generally five or seven days old at least before the patients arrived in Reading, and came with a variety of dressing. They were mostly gunshot wounds, and as such practically always involved muscle, parts of which were dead or dying as a result of the trauma. The tissues were generally dirty, sloughy and purulent, while the surrounding area was frequently œdematous. Where the patient was obviously ill, in pain, and running a temperature, it was marvellous to find that in three days after the salt pack had been introduced the temperature fell to normal, and that in a week or ten days' time the wound was a healthy bright-red colour and well covered with firm granulations. This result was achieved with the minimum of discomfort to the patient, since after the first packing it was unnecessary to redress it for some five, six, or seven days. In this way rest, one of the great allies in successful healing, was obtained. The fall in temperature, and the mental quietude engendered by the knowledge that no daily dressing was to be looked forward to, contributed to the patient's welfare. He was able to obtain refreshing and normal sleep, and his appetite generally improved, so that many of the vicious circles in operation were thus broken.

Impressed with the results obtained, we were anxious to know exactly whether the bacterial content of wounds so treated was actually less than before the treatment was begun; in other words, we desired to know if, apart from the claims of the protagonist of the method as to its physical properties in the wound, the salt had any definite and marked bactericidal action either directly on the organisms or indirectly through the leucocytes. To this end a series of observations were made before and after the salt pack had been removed, with, however, disappointing results. The bacterial flora seemed to be as numerous immediately after removal of the salt pack as before it, and the pursuit of this investigation was abandoned owing to pressure of other routine work. Nevertheless, the results *quâ* the healing of the wound were excellent, and, not being able to accept the theories put forward in explanation of its efficacy, we still remained in the dark. That the wounds did well, and got well probably sooner and with less disturbance than by any other method, was a clinical fact beyond dispute. How it did so we could not tell, and this is in accordance with the published statements of all others who employ this line of treatment. Men begin tentatively to try the method, rapidly become converts to its use, and, while acknowledging its extraordinary effect on wounds, profess ignorance as to the principles which underlie it.

THE FOUL ODOUR OF SUCCESSFUL CASES: ISOLATION OF ANAEROBE.

With this problem still unsolved it was noticed that while the majority of cases treated with the salt pack did well and followed a more or less stereotyped course towards complete recovery, one or two cases were outstanding exceptions, and recourse was had in these to other methods of treatment. Why some cases, treated in exactly the same way as the others, should not improve formed a new problem until a clinical observation—and on this hinges the subsequent work—was made by one of us (L. J.). This observation is of crucial importance. It had been noted by all who came in contact with wounds so treated, as it has been noted by

all who have adopted this method, that a powerful and most offensive odour was emitted from the salt-packed wound. Girling Ball,[1] for example, to quote one, says that the "foul odour is not an indication for changing the plug." Others say that the odour is a signal for change of dressing. No one attempts an explanation except in one paper[2] we have read where the view is expressed that it is due to a "decomposition in the dressings themselves." It was noted, however, by one of us (L. J.) in the course of clinical work that one or two of those cases which failed to improve were also devoid of this peculiarly offensive fœtid odour, and on recalling one or two previous cases that had not progressed satisfactorily it was remembered that they too were devoid of odour.

On considering together this phenomenon, and its possible explanation, we came to the conclusion that probably in the evil-smelling but successful cases there was present a bacterium which was absent from those which did badly and which did not smell. The idea was at first conceived that the salt pack might produce physical conditions in the wound which favoured the growth of this bacterium, and that the good results of the treatment might be directly due to its activity. Taking everything into consideration, it was thought by one of us (R. D.) that the organism present was most likely to be an anaerobe, and steps were accordingly taken to determine the presence or absence of such an anaerobe or anaerobes. A case was chosen from which the salt pack was about to be removed. This case was one which had obviously done well under the treatment and which emitted a most offensive odour. From the pus obtained from the wound two anaerobes were isolated in symbiosis, one with round terminal spores in very small numbers, and the other a bacillus having a large subterminal oval spore. The latter was present in large excess over the round-sporing bacillus.

The meat-broth tube in which the pus had been cultivated obviously contained a mixture, and as that tube showed evidence of active proteolysis and emitted the same powerful offensive odour as the wounds did, it was felt that the organism present in predominant numbers was responsible.

After two attempts, made as already described by one of us (R. D.) in THE LANCET,[3] the oval-sporing bacillus was obtained in apparently pure culture, and its morphological and cultural reactions worked out as described below.

The oval-sporing organism thus recovered, when introduced into a fresh meat-broth tube and incubated at 37° C. anaerobically, in two or three days emitted the characteristic wound odour, and the meat began to blacken and diminish in volume, indicating active proteolysis. This at once suggested the possible rôle played by this bacillus in the case of wounds—viz., that under suitable conditions for active growth and proliferation it did in the dead wound tissues what it appeared to do *in vitro*—viz., it digested them.

Looking at the organism from this point of view, we came to the conclusion that it was in reality the active and probably the sole agent concerned in the cleansing of wounds that did well, and that where it was absent the wound remained refractory to salt-pack treatment and acted as if an antiseptic were being used instead of salt. As the organism, however, belonged to the same group as *B. œdematis maligni* and *B. tetani* it was still looked on with suspicion in view of the universal horror of the presence of anaerobic spore bearers in a wound, and the natural desire on the part of the surgeon to get rid of such with all possible haste.

BACTERIOLOGICAL AND CLINICAL OBSERVATIONS ON THE ORGANISM.

Experiments were undertaken by one of us (R. D.) from which the organism was found to be non-pathogenic to the animals employed, and from which, further, it could be assumed that the culture medium in which the organism had been grown for varying periods of time apparently contained no elements toxic to those animals.

Taking these facts into consideration, together with the fact that it was apparently present, judging from the smell, and as a result of bacteriological investigation in all the cases which pursued a normal course, and where no harm seemed to come from it, it was felt by us that it would be legitimate actually to introduce the anaerobe in living culture into a wound which had previously been treated with salt pack but which had failed to smell or to improve. Such a case presented itself, and after making cultures from the wound to determine the absence of the organism one of us (R. D.) introduced a living culture, while the other (L. J.) carried out his usual method of salt packing. In three days' time the patient's temperature had come down, the wound was emitting a foul and characteristic odour, and the patient was comfortable. In a day or two after removal of the salt pack the wound was absolutely clean, devoid of all sloughs, a brilliant scarlet colour like fresh beef, and was covered with healthy granulations. This case was its own control. It had previously been packed in the usual way with salt bags; it did not smell thereafter, the patient did not improve, and the particular anaerobe described below was absent in culture. It was repacked with salt as before, with one added factor—viz., the introduction of the spore-bearer in question.

With these facts before us we concluded that the organism which we had introduced was in all probability the vital factor in determining the success on the second occasion of packing. Since then other cases have been encountered in which the salt bag did not alter the patient's condition for the better and which did not smell. These have been sown in the same way with the living culture after first making cultures from the wound to determine its absence from that wound before sowing. The wound has then been repacked in the usual way and has invariably done well and afforded nasal proof of the active presence of the organism.

MODE OF ACTION OF SALT PACKS.

The question then arose as to the rôle played by the salt, and we felt that possibly the tight packing with salt bags, together with the subsequent outflow of fluid and the collection of pus that accumulated in the packing, acted rather by reason of its rendering the wound more or less anaerobic than by any inherent virtue possessed by the salt, either as a germicide or in view of its supposed lymphagogic action. To determine this point certain cases were chosen, sown with a living culture of the organism and bags containing nothing but an inert substance—viz, sphagnum moss—were introduced in the same way as the salt bags so as to lie in contact with every part of the wound and to fill up the cavity completely. We felt that as pus and fluid accumulated the moss would swell out and so mould itself more closely to the form of the wound, while at the same time all interstices would become filled with fluid. In this way we should render the wound more or less anaerobic, and so afford the most favourable conditions for the growth of the anaerobe. At the same time the element of salt would be eliminated.

As we anticipated, the cases so treated followed exactly the same course as those in which the organism had been sown, but where the usual salt bag had been used.

Hence we come to the conclusion that salt is not necessary in the treatment of wounds, and where salt packs are employed they act more by rendering the wound anaerobic, so providing favourable conditions for the growth of the organism where that organism is present. When the latter is already present it gets to work, and the case goes on to a satisfactory termination. Where the organism is absent the salt pack, in spite of the salt and all its supposed lymphagogic action, is useless in cleaning the wound or improving the patient's condition. We arrive therefore at a point where we can recommend the employment of a method of wound treatment which involves the simplest of technique, the simplest and cheapest of dressings, for salt or sphagnum moss can easily be had, and the least disturbance to the patient. It does away with the need for frequent dressing and the mental and physical suffering entailed thereby.

In order to ensure this result, however, it is necessary that the organism or its spores be present, and although it appears to be frequently present it cannot be depended on to be so. Hence in such cases the wound ought to be sown with the organism at the time of packing.

As it is a spore-bearer and an anaerobe, supplies of it could easily be kept in small ampoules or glass capsules, which could be broken over the wound, thus setting free the spores.

Since coming to these conclusions, we have further investigated bacteriologically the flora of wounds that have done well and have smelt, and we have invariably recovered this organism, as we have, of course, done in the cases which were sown of set purpose.

It is true that we have had no acute cases of gas gangrene to treat in this series, although the wounds so treated have been large, filthy, and sloughy, and we cannot say

from personal knowledge how it would act in such. We can, however, point to the published experience of several observers [4] who have used the salt-pack treatment with marked success in cases of gas infections from which *B. perfringens* has been isolated. This evidence leads us to believe that in acute cases of gas infection the presence of the organism we describe together with salt or sphagnum-moss pack is likely to be attended with the same good result as in septic wounds showing no clinical evidence of gas infection. We reach, therefore, a somewhat paradoxical conclusion—viz., that septic wounds can be successfully treated by sowing in them another spore-bearing anaerobe and thereafter rendering the wound more or less anaerobic. It certainly sounds like rank heresy and yet the evidence we adduce is too strong to be disregarded.

Importance of Dead Tissue in the Wound.

Now it is common knowledge that the danger of a wound, apart from actual destruction by the inflicting trauma, is the entry into that wound of pathogenic organisms. Since Lister's time the destruction of the invading germ has engrossed men's minds, and by means of all kinds of antiseptics it has been sought to combat the infection. Endeavour to achieve this end in this way has within the last two and a half years given way to attempts to fight the evil by using the patient's own protective forces—the so-called physiological method. The recognition that the body must take its part in the struggle and do the necessary work of repair is the merit of the advocates of saline. The advantage, however, does not consist in the action of saline as described by its originators, and that the saline treatment of Wright has had to yield ground considerably since its inception is proved by the increasing frequency with which total excision of the wound is being resorted to.

Throughout all these years of observation and work in wound infection the importance of the dead tissues present in the wound has been neglected or relegated to a secondary place.

The view is now rapidly gaining ground that the dead tissue is the all-important factor. It is from this as a base that pathogenic organisms elaborate the toxins with which they gradually lower the patient's resistance and from which some of them make sundry excursions into the patient's body. The toxins may either be specific toxins elaborated by the germs themselves or they may be formed as a result of the splitting up of the dead tissue by the vital action of these germs. Destroy the base—the submarine base, so to speak—from which these germs derive their supplies and the source of the undermining poison is cut off. Antiseptics do not achieve this. They may kill a few of the germs, but even though they eradicate the infection it is not for a considerable time, for their use implies an added trauma to the tissues. The physiological method does not necessarily inflict a fresh trauma, but leaves the body by its own forces to overcome the infection and to cast off the dead tissue.

This takes time, and as long as the basis of supply is left it is a perpetual source of danger. Recognising this, the tendency of surgery is now, as we have indicated, to remove the dead material by the knife—to excise the wound, in other words. But the exact amount of dead material cannot always be appraised with the naked eye, and, moreover, the very act of excision inflicts a fresh trauma liable to become immediately re-infected. Further, this is a gross and mutilating form of attack, and for anatomical reasons is not always possible. A consideration of the histological features of gunshot wounds has led Bashford [5] practically to advocate immediate excision, impressed as he is by the almost constant presence of anaerobic organisms in relation to the dead tissues. Our whole knowledge of anaerobes, however, is imperfect and chaotic. So many of them being practically saprophytes produce potent poisons as a result of their activity on dead tissue that all are indiscriminately condemned. The organism which we describe here, however, is apparently one of the exceptions. It is apparently non-pathogenic, does not produce toxins inimical to the human body, and does not apparently attack living tissues. At the same time, however, it appears to be able rapidly to break down dead tissue without in doing so producing toxins, and this is proved, amongst other things, by the appearance of the shreds of slough remaining in the wound after removal of the salt bag. These look thin, almost transparent, and generally wash away easily under slight irrigation.

This organism can dissect away the macroscopic and microscopic dead tissue in a way that no surgeon's knife ever can, and that without at the same time producing any further trauma. The devitalised tissues are practically all removed in a few days, and with their destruction the breeding ground of the pathogenic germs is destroyed, while the living tissues, relieved of the strain of ever combating the increasing infection while trying to cast off the devitalised tissue, is able to turn its energies to repair, as evidenced by the rapid formation of healthy, strong granulations.

Description of Method of Treatment.

We should like to emphasise again the extreme importance of the presence of devitalised tissue in a wound; and no wound can be inflicted without a certain amount of devitalisation, whether microscopic or macroscopic.

There are certain points, however, to which it is necessary to draw attention in the treatment of these wounds, and they are points which must be borne in mind.

The most important and fundamental is the need to lay open a wound in the most thorough manner possible. It is a point that is not always carried out, but it is essential. Whether obviously dead tissue is cut away or not at the same time is, with the method of treatment we advocate, not absolutely necessary, but it is all-important to lay open every pocket so that the packing will be in contact everywhere with the walls of the wound. As the wounds are so often irregular and burrowing, this will call for the ingenuity of the surgeon in each case. All foreign bodies must likewise be removed, and any grossly damaged tissue may at the same time be removed.

The interior of the wound is now irrigated with sterile water or saline to wash away obvious pus or blood, and the living culture of the organism is now sown in the wound. Hitherto we have used a pipette for the purpose. Immediately thereafter the packs, whether of salt or of sphagnum moss, are introduced into the wound so as to come in contact with every part of it. Just before introduction the packs are moistened with sterile water or saline. Over this several layers of plain gauze are laid after slightly soaking in the same way. The wound is thus completely and firmly packed and over all a thick layer of cotton-wool, after which the whole is firmly bandaged. It is an additional help to steady the limb by means of a splint. The packing itself, however, acts as a splint, as we shall see in the sequel. Where salt has been used the patient has some slight pain for a few hours, and whatever pack has been used the temperature will probably rise even higher than it was before interference with the wound.

For the first 24 hours, if salt has been used, there is a very copious discharge of fluid, doubtless due to the concentration of salt in the wound. Thereafter the flow ceases, presumably as a result of reduced salt concentration. A certain amount of pus oozes away, and towards the end of the second day, or at latest the third day, the wound begins to smell in cases which have been unsown but where the organism has been present. This corresponds more or less closely to what occurs *in vitro*. A culture sown in meat broth from the sporing form does not begin to smell much till the end of the second or till the third day, and probably means the length of time needed for the spores present to germinate sufficiently for the proliferating organism to attack the dead tissue in sufficient numbers to be able to cause the smell. At the same time, as has been noted by nearly all who have written on the salt-bag treatment, the temperature begins to come down towards the end of the second or third day, and thereafter, as a rule, stays down. This seems to coincide with the production of the foul odour. If in an unsown case where salt bags are used, by the third or at latest the fourth day, the temperature shows no signs of subsiding and the wound does not emit the offensive stench, it is not doing well, and is not going to do well under that treatment, and it is a signal for the sowing of the wound with the living organism. Where, on the other hand, the characteristic smell is markedly present, and yet there is no fall in the temperature, look for some other focus of infection or some other wound, perhaps slight, and consequently treated by one of the old antiseptics.

From the third day onward the patiently steadily improves. There is no daily dressing to worry him, except perhaps the

laying on of a fresh pad of cotton-wool, he has no pain, and is able to eat and sleep well. There is only one objectionable feature—viz., the foul odour, and that is the signal that all is going well. The temperature is said, by most observers, to be no criterion so long as the pulse and the patient's general condition is good. The temperature, however, is a valuable guide taken in conjunction with the presence or absence of odour.

FIG. 1.

Agar slope culture some days old.

Next comes the question of how long the pack is to be left in. Further observation on this point is necessary, but probably seven days at least, although it will probably vary with the type of wound. The packing is removed without an anæsthetic, as a rule. When one goes to remove it, the superficial part of the packing will be found more or less firmly adherent to the skin, and set hard like a board. Exactly how this happens we do not propose to discuss here. Suffice it to say that it has been observed by all who have written about this method.

After detaching the board-like upper dressing from the skin, the rest of the pack comes out easily and *en masse*, bathed, as a rule, in bright-yellow pus, from which we can recover the organism.

A few more or less delicate sloughs may still remain adherent, but on irrigating, they either become detached at once, or do so a day or two later. As the fluid pours over the surface they wave about like little fragments of transparent seaweed. The fluid used is either warm normal saline or eusol. The rest of the surface will be seen to be red and clean. After 24 hours more, during which time plain gauze wrung out of saline has been placed in the wound, the exposed muscle will be a brilliant red, devoid of sloughs, and covered by firm, healthy granulations which bleed easily if touched. All œdema has disappeared from the neighbourhood.

DISCUSSION OF SOME POINTS OF INTEREST.

Such a wound rapidly heals, can be skin-grafted and brought together. In any case, it has been noticed that such wounds result in a beautiful, firm, and more or less linear scar. One other point remains to be mentioned—viz., that in no case where we have used salt bags has secondary hæmorrhage occurred. This also coincides with the recorded observations of others. Major A. J. Hull,[6] R.A.M.C., for instance, states that in his hands the salt-bag treatment has been one of the most generally applicable of procedures for the treatment of secondary hæmorrhage. This, of course, is in direct opposition to the expressed statement of Sir Almroth Wright,[7] who says that the aim and object must be to prevent any digestive action in the neighbourhood of the endangered artery.

Another point of interest is the appearance of sequestra. These appear, so far as our observation goes, to come away more rapidly than in cases not so treated, and when they do come away they are white and clean and devoid of all soft tissue. Further, where from anatomical reasons it is necessary to carry out manipulative procedure for the removal of the sequestra, it has been observed that there is no post-operative flare-up as there is in cases which have been treated otherwise. Doubtless this is due to the fact that in the former case all the dead soft tissues have been thoroughly proteolysed, and the breeding ground in the bone for lurking pathogenic germs has been destroyed, whereas in the latter they are both present, and even slight manipulation causes a reinoculation of the patient and a consequent flare-up.

There are many other points which space forbids us to discuss, points observed and raised by others who have used used salt bags, but a consideration of the facts we put forward in this paper will probably explain away some of their difficulties, and we venture to hope furnish a true rationale of this simple method of treatment.

We propose, in the meantime, to christen the organism the Reading bacillus. It certainly belongs to the proteolytic group, but in view of the somewhat chaotic state of knowledge regarding the whole group of anaerobic spore-bearers we are not concerned for the moment to identify it with any previously described, though doubtless it has been observed and described before, a very similar organism having been noted by Miss Robertson, for example, in war wounds.

The main thing to recognise is the possibility of turning it to advantage, and so using one type of germ to deprive the others of their breeding-ground. Doubtless, also, other organisms may be turned to use, as some have already been to commercial purposes.

After the following brief account of the organism we shall append a brief description of a few cases from among many treated by the salt-bag method. They are chosen in order to illustrate points referred to in the paper, and at a later date we hope to be able to correct where necessary or to amplify the statements we have made. Cultures of the organism will willingly be furnished on application to Dr. Donaldson, Pathological Department, War Hospital, Reading.

We feel that the views here expressed and the proofs given will at once supply the key to much that has been obscure to those who have used the salt-pack method to any extent. They are unanimous in stating that the superiority of the salt pack is an undoubted clinical fact, but why it should be so they admit they cannot explain.

We are thoroughly alive to the fact that, while proteolysis of the dead tissue appears to be the fundamental principle involved, there may be other factors of a bio-chemical character at work as a result of this organism's activity, especially in view of the almost immediate and rapid improvement in the general condition of the patient. Such, however, will form a subject for further research. But there is some evidence for believing that the Reading bacillus is not without effect on the tox-albumins produced by other organisms.

FIG. 2A.

FIG. 2B.

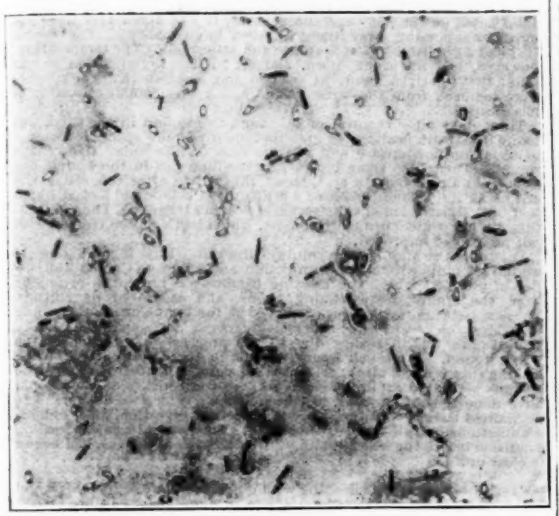
Colonies from an agar plate 18 days old. × 10.

CHARACTERS OF THE READING BACILLUS.

The reasons for giving it this name provisionally have been indicated. It appears to be a saprophyte, and may be identical with what Miss Robertson[8] has been able to isolate from wound infections, and which, according to her, con-

forms in its morphological and cultural characters with the *B œdematis maligni* of Koch, as described by von Hibler. Owing to the non-pathogenicity of the Reading bacillus, we do not feel disposed in the meantime to follow Miss Robertson's lead with regard to its correct designation. The fact of there being undoubted strains with morphological and cultural characters similar to those of the malignant œdema bacillus of Koch, which are nevertheless non-pathogenic even when freshly isolated from wound infections, while his bacillus is

FIG. 3.



The Reading bacillus grown for 48 hours in maltose broth. Gram. × 1000.

definitely pathogenic, suggests that there is much yet to be done before a correct terminology is arrived at. Space forbids the inclusion of any detailed description of the organism, and no reference is made to work still in course of investigation. The characters as given are based on a study of what we consider to be most likely a pure culture. This culture was arrived at (after repeatedly plating out) by the dilution method already referred to, and only then after the second attempt.

Morphology.—The organism consists of a rod having a fairly large oval subterminal spore (Fig. 3). The actual shape is probably best seen in hanging-drop preparations when the body of the bacillus appears to be somewhat torpedo-shaped. The blunter and broader end corresponds to the situation of the contained spore and from this the body gradually narrows to the opposite extremity. In dried films, on the other hand, the oval spore appears to bulge out on either side beyond the bacillary body, but this is apparently an artefact. In a few instances the spore is central while the bacillary body tapers away to either extremity, and occasionally one or two can be seen where the oval spore is situated terminally. The bacillus is provided with numerous long wavy lateral flagella which, when seen detached, closely resemble spirilla with regular undulations (Fig. 4). Under certain conditions there may be found along with free bacilli, chains composed of bacillary elements of varying size, one or two of which may even show spore formation. The chain form may be represented by an unsegmented filament. In young cultures, of course, non-sporing bacilli predominate, while in old cultures on solid media practically nothing remains but spores, some of these still in chain formation with the suspicion of the outlines of a filament in which they have apparently been formed.

Size.—The average length of the sporing bacillus varies from 2·5 to 5·3μ with a breadth of 0·5 to 0·9μ, while free spores show an average of 1·46μ long by 1·02μ broad. These figures refer to the organism in the dried film and, of course, there are other forms either larger or shorter.

Motility.—The organism, both in its sporing and non-sporing form, is actively motile, having a somewhat waddling movement, and the power of motility apparently persists for a considerable length of time.

Staining.—It is Gram-positive, stains easily with other stains, but is not acid-fast.

Range of growth.—Its exact limits of growth or optimum temperature have not been determined, but it will grow at 18° C. and probably also at 41° C., although it appears to do best at body temperature. It will, of course, persist for long in the spore form, which appears to be fairly resistant to heat. It appears to be strictly anaerobic and has marked proteolytic properties.

Cultural reactions.—All cultures emit a strong, characteristic, and somewhat fœtid though not unbearable odour. This is perhaps best observed in meat-broth tubes and, if the culture has been raised from spores, does not become really strong till the end of the second or till the third day. In about a week's time in such a tube the odour has begun to diminish.

Gas is also formed in greater or less degree according to the culture medium employed.

In broth containing minced-up bullock's heart slight blackening begins to appear towards the end of 48 hours where the culture has been raised from spores and is quite definite as a rule on the third day. During the same time the volume of contained meat can be seen to be diminishing in volume and to be going into a state of finer subdivision. This diminution gradually becomes more marked. Gas can be seen on the second day in the form of a few bubbles caught between the fragments of meat, but is given off in greater quantities on the third day. The gas consists largely of CO_2, H_2S, and ammonia. The supernatant broth is turbid, but in an old tube which has been standing for some time, the turbidity deposits and the upper layers of fluid become fairly clear.

On *agar* surface colonies are small, about the size of small streptococcus colonies (Fig. 1). They are slightly raised, rounded, shiny, and translucent at first, but later tend to become more opaque. The edge is not sharply defined but merges into a radiating tangle of fine thread-like projections for the definition of which a hand lens is generally required. In place of or along with these fine filaments may be seen sometimes somewhat broader outgrowths which look like transparent fimbriæ.

If the water of condensation has become infected growth occurs fairly rapidly as a faint opalescent film spreading up between the tube and the medium with a growing edge which is often fimbriated. The agar ultimately becomes cracked and split up by gas.

Deep colonies can just be seen with the naked eye after 48 hours growth, when their size resembles that of young streptococcus colonies. They appear, however, slightly opaque, depending on their depth in the medium and their size, and have a dirty-white colour. With a hand lens the central part appears irregular in shape, being oval, triangular, &c., with rather blurred edges which merge into a tangled massed of filaments which are growing out from it into the medium. The resulting colony looks fluffy, resembling a little speck of cotton-wool embedded in the medium (Figs. 2A and 2B). The best growth is apparently obtained in media to which glucose has been added.

Gelatine is fairly rapidly liquefied, the fluid becoming turbid.

Inspissated serum is gradually eaten away, the crumbling edges being slightly blackened.

Dorset egg medium is more rapidly broken down, preceding which there is a greyish-black discolouration of the medium.

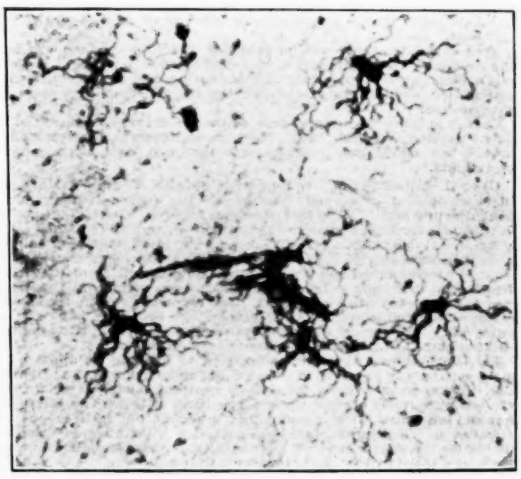
Broth becomes turbid with a greater or less fleecy deposit, according to the ingredients of the medium, and there is a certain amount of gas generated. This is considerable in glucose and in glycerine broth, but rather less in plain nutrient broth, and only a very little in inulin broth. The turbidity is greatest in glucose broth and least in glycerine. On standing for some time the deposit tends to settle, leaving the upper layers of fluid fairly clear except in the case of glucose broth.

Potato.—No growth visible to the naked eye has been observed, even after some weeks of culture, but slight growth does take place.

Litmus milk.—No clot is observed even after many days' incubation. Instead the milk is broken down into fine granules, and it becomes much less opaque and more watery. After three days' incubation it is apparently slightly acid, and differs in this respect from the cultural characters of the organism described by Miss Robertson. Gas is produced.

Litmus peptone water is rendered turbid and definitely alkaline. No indol appears to be formed.

FIG. 4.



Reading bacillus, showing flagella from a 24 hours' agar slope. × 1500.

Fluid egg medium becomes more opaque, a fairly heavy deposit settles, and considerable gas is generated.

Neutral-red broth.—No change in colour is observed in strong dilutions. The neutral red inhibits the growth of the organism and apparently kills it, as subcultures made from various dilutions have failed to grow. In higher dilutions, however, the colour is discharged, and the fluid becomes markedly fluorescent.

Other media.—In the case of the sugars, glucosides, &c., the reactions of the Reading bacillus have been observed in litmus peptone water and also on serum litmus agar, each with its appropriate sugar. The sugars, unfortunately, were not pre-war sugars and the peptone was Fairchild's. Glucose, maltose, lævulose, and dextrine are all turned acid, while a

considerable quantity of gas is generated. The colour change is not of equal intensity in all four tubes. Saccharose and sorbite are rendered a lilac tint, the former having much less gas, and only changing colour after several days' incubation. No acidity has been observed in mannite, lactose, raffinose, dulcite, inulin, starch, salicin, or glycerine, although there was a slight generation of gas in all except in the last, where it was fairly considerable.

Optimum reaction.—This is probably about + 5 to phenolphthalein. A good growth is also obtained in broth with a reaction of + 3·5. After 10 days' incubation, however, growth also took place in broths with a reaction of + 16·75, + 10·5, and − 0·5 respectively. The reactions were determined in uninoculated broths in the cold after final sterilisation.

Pathogenicity.—Rabbits, mice, and guinea pigs have been inoculated intravenously, intraperitoneally, or subcutaneously into the muscles both with cultures grown on solid and in fluid media respectively. The cultures were of various ages. We do not propose to go into details of dosage, &c., beyond stating that as many as 30,000 millions of living bacilli have been given to guinea-pigs without death or any other disturbance taking place. As noted in the text, it has been now sown in very liberal quantities both in recently incised as well as in septic wounds of varying age without any evidence of the slightest pathogenicity. Further experimental work is in hand, but it would be premature to mention this at present.

RECORD OF CASES.

We now append a few cases, chosen because they illustrate most of the points raised in the paper and because they bear out the statements made concerning the beneficial action of the bacillus and its non-pathogenicity.

CASE A.—Admitted with gunshot wound of left buttock and a smaller wound near right anterior inferior iliac spine containing a foreign body. On arrival in Reading it was suppurating, and had been plugged with gauze. For the next 5 days there was an irregular temperature ranging from 99° to 104° F., with pulse of 96 to 116. At the end of this period of 5 days the wounds were thoroughly laid open, the foreign body removed, and salt bags inserted.

The temperature, however, did not fall, and it was noted that the characteristic salt-bag odour was absent. The bags were left *in situ* for 6 days, and, as there was no improvement, they were removed, and eusol dressings substituted. It was noted on removal that the wound was œdematous and unhealthy, and that no separation of the sloughs had occurred. Eusol dressings were persisted in for the next 21 days before the wound could be pronounced clean and healthy, although the temperature came down after 4 days of eusol treatment, and remained down with the exception of 9 days, during which it fluctuated between 100° and normal.

This is an example of a wound packed with salt bags which did not smell, and which took 40 days from receipt of injury to reach a point when it could be considered a healthy granulating surface.

CASE B.—Admitted at Reading 10 days after receipt of gunshot wound of right knee involving the joint. The wound was very sloughy, thoroughly exposed, and the patella had evidently been removed. Six days later the limb above and below the joint appeared very œdematous, and a considerable amount of pus could be expressed from under the skin on the inner side of the joint. Two days later this sinus was laid freely open. Five days thereafter the œdema of leg and thigh was more pronounced and the patient appeared hectic. The wound was at once thoroughly opened up again, multiple superficial incisions made in the neighbourhood, and the whole well packed with salt bags.

Five days later there was no evidence of characteristic odour from the dressings, the temperature still continued to jump, and the man was evidently going down hill. The following day, after consultation, amputation was performed through the thigh. Four days later the patient died.

This is another example of free exposure of the wound and subsequent packing with salt bags. No improvement whatever took place, no salt-bag odour was detected, and the man died apparently of septicæmia.

CASE C.—Admitted at Reading with gunshot wound of right leg together with a compound fracture of the femur received about 3 months previously. The history was as follows. The patient lay out in the open for 4 days before being brought in, and he remained at the C C S. for 11 days, during which time gas gangrene developed and the patient became very ill. He was removed to a base hospital, where the wounds were explored and drained. (No notes available of the wound dressings at that time.) Later a sequestrum was removed. The wound was then packed with salt bags, but for some reason these were removed the following day, his temperature being 102·4° F. and his pulse 138. The wound was then syringed with H_2O_2. His condition still remained bad. He was then transferred to England.

For the first few days after admission to Reading he appeared to make satisfactory progress. Then swelling and œdema of the thigh and rise of temperature made themselves apparent, and 7 days later the wounds were freely opened up and the bone drilled. The latter was soft and infiltrated with inflammatory products, but no free pus was discovered. The wounds were then packed with salt bags. Two days thereafter the wound emitted a powerful and characteristic odour and the edges looked dirty and sloughy. Cultures were made and the Reading bacillus isolated, together with pyogenic organisms. Six days after packing the salt bags were removed and the patient's condition was excellent. Three days later, after normal saline dressing, the wound was reported to be clean and lined with healthy red granulations. A few days later a small sequestrum came away in the dressings, and in 6 weeks' time from the introduction of the salt bags the wound was completely healed.

This case illustrates several points. The patient had suffered considerably from exposure before treatment and had developed gas gangrene. Salt bags had been applied abroad, but were not persevered with beyond one day. On reaching Reading salt packs were again introduced and kept in. The temperature fell the following day and remained normal. The wound gave out the characteristic smell and the Reading bacillus was isolated from the discharges.

CASE D.—Admitted with accidental gunshot wounds of left thigh, testicle, and right arm received the same day, several foreign bodies being present in the wound. There was an entrance wound just below fold of left buttock and a large explosive exit wound in the upper third of left thigh, a wound of the left side of scrotum, and a transverse wound on the flexor aspect of right wrist. In the region of the thigh wound there was much destruction of muscle tissue. The femoral artery was exposed and lying bare on the outer side of the wound. A piece of the tuber ischii had been chipped off and a channel passed up into the pelvis.

Lister's technique was used for disinfecting the skin, the wound was irrigated with 1 in 3000 biniodide, and salt bags were introduced. The testicle was removed and the wound on the wrist stitched up.

Four days later the salt bags were removed as the temperature was rising and the edges of the wound looked black, sloughy, and semi-digested. The odour was intense but characteristic. There was no swelling or œdema anywhere near the wound. Cultures made from the pus showed the presence of the Reading bacillus. Eusol irrigation was substituted for the salt bags, and next day it was noted that the dead muscle was coming away freely in fairly large quantity. The wound still had a greyish-black appearance and still smelt. The temperature, however, had not come down, and on further investigation it was found that the right hand was swollen and œdematous. The stitches were removed from the wrist wound and a considerable quantity of pus escaped.

Three days after removal of salt bags the wound in the thigh was found lined with healthy red granulations with a few specks of sloughy material on the surface and a larger one on the outer side of the wound. There was some brown foul-smelling pus in the wound, but no surrounding œdema or erythema. Eight days after removal of the salt packs the wound presented a brilliant red colour and looked like a text-book illustration of a dissection of Scarpa's triangle. The temperature did not come down till the wrist, which had *not* been treated with salt packs, had improved.

This case also affords some points of interest. First it was a gunshot wound seen immediately after infliction and there was much destruction of muscle tissue. The Reading bacillus was present as presumed from the almost overwhelming odour, and as proved by culture. The salt packs, however, were removed as the temperature was going up. This, on further consideration, was a mistake. The rise of temperature was in reality due to the progressive infection of the wrist wound. The much larger wounds in thign and buttock, while looking sloughy and black, presented no signs of acute infection. The sloughs separated rapidly but probably not so quickly as they would have done if the salt bags had been left a day or two longer. The devitalised tissues were obviously in process of digestion, and, indeed, granulations had already begun to form. This wound was in a healing condition before the wrist wound, untreated with salt packs, had begun to clear up.

CASE E.—Admitted at Reading with gunshot wound of left thigh and leg received about two months previously. The history before arrival in England was as follows. There had been a very severe gaseous cellulitis of the leg and a less severe one of the thigh. Carrel-Dakin treatment had been used throughout. He had already been in the operating theatre on 25 occasions for various operative measures before reaching England. On arrival here the limb was still very œdematous, the four leg wounds looked unhealthy, the granulations were sodden and œdematous and tunnels ran in through them to the bone, these tunnels being occupied with Carrel-Dakin tubes. The wound in the thigh was similar to that in the leg and was discharging much pus.

All 5 wounds were laid freely open, deep collections of pus evacuated from each and small sequestra removed. All were then dried with plain gauze and sown copiously with a living culture of the Reading bacillus. Each one was firmly packed with salt bags moistened in normal saline and layers of gauze similarly moistened were laid across the wounds. The temperature rose after the packing, as it does in most cases, but the patient was comfortable. On the second day after packing the œdema was seen to have diminished.

The salt bags were left *in situ* for 9 days and on removal of the bags the characteristic odour made its presence strongly felt. The superficial gauze was seen to be dry, brown, board-like, and firmly adherent to the skin all round the wounds. The odour was quite characteristic. On loosening the adherent edges the whole packing came out *en bloc* bathed in yellow pus.

The thigh wound was then irrigated with eusol after which it was seen to be perfectly clean and red. The fragment of exposed bone could be seen *in situ*, looking white and clean. All œdema had disappeared from the tissues around.

The wounds in the leg showed much the same appearance, but there were still present in them a few very delicate thin sloughs which looked as if they were nearly digested, while bright-red, easily bleeding granulations could be seen all round. All œdema had disappeared from ankle and foot and had almost disappeared from the leg. The wounds were simply irrigated with eusol and dressed with plain gauze daily and are now healing up.

This case again is of interest, as it was one of severe multiple wounds with comminuted fractures of femur and leg bones which had become infected with a gas-producing bacillus. He had been under Carrel-Dakin treatment for two months and had had 25 operations of one sort or another performed. In spite of this the wounds were unhealthy, full of pus, and the limb œdematous on arrival in Reading. No risks were taken and the Reading bacillus was at once sown and salt packing applied without any other operative procedure whatever beyond reopening the wounds, more freely evacuating pus, and swabbing up with dry gauze. Within ten days from the commencement of the treatment the wounds were healthy, lined by strong granulations, and all œdema had gone. The Reading bacillus was recovered from the wound when the salt packs were removed.

CASE F.—Admitted at Reading 17 days after receipt of gunshot wounds of left leg and chest. There were two clean wounds above the left ankle, together with a fracture of the fibula. There was another situated on the posterior aspect and several more on the leg and thigh, as well as three clean wounds of left side of chest and a small hole on the front of the right thigh discharging pus. Nine days later it was noted that the wound above the right ankle was suppurating, and two days after that, as the patient's temperature continued to show a daily rise, an abscess was evacuated from the region of the left ankle, together with a foreign body. The wound being thus laid freely open was then packed with salt bags.

These bags were left *in situ* for six days without interference, meanwhile no odour was perceptible and the temperature showed even greater daily fluctuations than before. The bags were accordingly removed, and it was seen that there were considerable swelling and œdema of the foot and ankle. Cultures were made from the pus, but we failed to isolate the Reading bacillus. The following day the wound was reopened, pus evacuated, and the cavity dried out with sterile gauze. The wound was then liberally sown with a living culture of the Reading bacillus and immediately packed with bags of sphagnum moss moistened with sterile water.

The following day the patient stated that the ankle was more comfortable than it had been since he was wounded. The temperature fell considerably on the third day, and on the seventh day after moss packing it came down for good. The moss was left *in situ* for six days, during which time the characteristic odour was very perceptible. From cultures taken on removal of the bags the Reading bacillus was recovered.

The superficial gauze and layers of the sphagnum-moss bags had set quite hard and board-like, as in the case of the salt bags. The wounds were covered with a greyish-yellow purulent discharge, but on irrigation with eusol they were found to be lined with perfectly healthy red granulations. All swelling of the foot and ankle had disappeared.

This case illustrates that free opening of the wound, evacuating of pus, and plugging with salt bags is not necessarily followed by improvement. In connexion with this are to be taken the facts that the characteristic smell was absent and that we failed to prove the presence of the Reading bacillus. At the second operation the Reading bacillus was introduced in living culture and to eliminate any action by salt an inert substance, sphagnum moss, was used for packing. The wound at once began to do well and in six days was a granulating healthy surface. The characteristic odour was present and the organism was recovered. It is to be noted that while the sphagnum-moss bags were hard and board-like on removal exactly as is observed with salt packs, the initial copious flow of fluid which always occurs during the first 24 hours after the introduction of salt bags was absent. The effect of the concentrated salt where salt bags are used is probably solely a hydragogic one, since both are equally hard and dry on removal, suggesting a more or less impermeable layer of albuminous matter, while inside there is a copious supply of fluid pus.

CASE G.—Admitted at Reading with gunshot wounds of left foot and right leg, received eight days previously. On arrival it was found that pieces of shrapnel had been removed from both wounds. There was a small suppurating wound on the inner side of the left foot, just above the base of the first metatarsal bone. The outer side of the foot was œdematous. There were also through-and-through wounds about two inches apart over middle of fibula.

Three days later the wound in the foot was opened up for the purpose of extracting a foreign body and the cavity was then packed with Morison's B.I.P.P. Nine days thereafter he was sent to an auxiliary hospital. Nine days after that a small piece of bone came away from the foot. Five days thereafter the patient complained of severe pain in the foot with a temperature of 100° F. Fomentations were applied, but it became more swollen and painful, and two days later the foot was incised on the inner side. The outer side of the foot was discharging pus freely. The temperature was now 101·4°. Saline baths and fomentations were applied. Seven days later, as the temperature refused to come down, the patient was anæsthetised and several pieces of the scaphoid were removed. Incisions were made in many places, pus evacuated, and drainage tubes inserted.

Next day the foot was still greatly swollen, but there was very little free discharge and the temperature was still up. Three days later, as no satisfactory progress was being made, the patient was sent back to the central hospital for further treatment or amputation. On arrival in Reading the patient was again anæsthetised, and, after taking samples of the pus for cultural purposes, multiple incisions were made into the foot and the mid-tarsal joint was found to be infected. The wounds were then irrigated with hot normal saline, and both the old wounds and the freshly made incisions were sown with a living culture of the Reading bacillus. The wounds were then packed with salt bags. The cultures made from the pus yielded a copious growth of *Streptococcus longus*, together with a few colonies of *Staphylococcus aureus*.

The temperature immediately began to fall and the œdema to diminish, while the characteristic odour made itself evident. The salt bags were removed in five days' time and the wound irrigated with normal saline. They were lined with a sero-purulent exudation and there were present some dirty sloughs, which cleaned up at once under irrigation. Cultures were made from the wounds and streptococci, staphylococci, and the Reading bacillus were isolated. Three days later, under simple normal saline dressings, the sloughs were found to be fast disappearing and the wounds were rapidly cleaning up. Cultures made at this point yielded only staphylococci and the Reading bacillus. Three days later the wounds were perfectly clean and lined by firm, red, healthy granulations. Cultures made showed only a few colonies of staphylococci and diphtheroids, but the Reading bacillus was not again recovered. In about six weeks from the date of removal of the salt bags all the wounds in the foot were healed. The movements of the foot were much improved and there was considerably less talipes equinovarus.

This patient appeared to be doing fairly well after the B.I.P.P. treatment. There was, however, apparently a latent infection still present in spite of the B.I.P.P. treatment, which flared up later. In spite of multiple incisions, saline baths, and saline dressings the foot went from bad to worse. The patient was extremely ill, the foot greatly swollen and bright red due to the streptococcal infection, and the discharge was scanty. The joint was found to be involved. The Reading bacillus, together with salt packing, at once altered the patient's condition, and his foot made an uninterrupted recovery. It is further to be noted that even after five days of salt-bag treatment streptococci were still present, showing how much value to lay on the supposed bactericidal properties of the salt pack. The B.I.P.P. treatment in this case had not been a success.

In conclusion, our thanks are due to the sisters and nurses for their intelligent coöperation in the clinical side of the work, and to Miss Clark, B.Sc., to Mr. R. C. McLean, D.Sc., and to Mr. Lamb for their active and ungrudging assistance in the scientific part of the investigation.

Summary.

1. Three main methods of wound treatment are at present in vogue: the antiseptic, the physiological, and the surgical, viz., by excision of the wound. The last-named has come into vogue because of the disappointing results obtained from the first two, on the score of their inefficacy or because of the time element.

2. From the physiological or hypertonic saline method has evolved as an offshoot the salt-pack treatment of wounds, for which its advocates claim extraordinarily good results.

3. These include the simplicity of method, the avoidance of daily dressing of the patient, the rapidity with which the wound becomes a healthy granulating surface, the absence of secondary hæmorrhage, and the rapid general improvement of the patient. All this means a considerable curtailment of the time spent by the wounded man in hospital.

4. Hitherto the good results have been attributed in some obscure way to the presence of the salt acting more or less on the physiological lines described by Wright; but it is felt by all who have written about salt packs that some other explanation is necessary.

5. We afford what we believe to be the true explanation of the phenomena observed, and believe that it will clear up many of the points that have hitherto been obscure.

6. The key to the situation depends on two observations—one clinical, the other bacteriological. The former consists in the fact that cases which smell (and the odour is one of the most characteristic features of these cases) do well, while those which do not make no headway. The bacteriological observation consists in the discovery that a certain bacillus is apparently constant in the wounds which emit the odour, while it is absent or cannot be recovered from those which do not smell.

7. This bacillus is a spore-bearing anaerobe of a saprophytic nature and belongs to the proteolytic group of organisms—the group which includes *B. tetani* and *B. œdematis maligni*.

8. Unlike these latter, it appears to be non-pathogenic to the animals experimented on, and, what is of more importance, appears to be non-pathogenic for man when introduced into wounds. Further, unlike the above-named pathogenic varieties, it does not appear to set free any toxins injurious to the patient in the course of its action on the dead tissues.

9. A brief outline of the morphological and cultural characters of the organism is given, its probable mode of action, and the results of animal experiment.

10. While it may be one that has been fully described before, we make no attempt in this paper to identify it with such, in view of the somewhat chaotic state of our knowledge regarding anaerobes. Hence, for convenience sake, we call it the *Reading bacillus*.

11. It acts, apparently, in virtue of its proteolytic powers only on devitalised tissue, and possibly on tox-albumins, and appears to possess no power of attacking healthy structures.

12. Special stress is laid on the necessity of recognising the fact that one of the chief factors which keep a wound septic is the presence of devitalised tissue in that wound. This acts as a base from which pathogenic organisms attack the body. We would lay even greater stress on this than on the infecting organisms.

13. The surgical or excision treatment of wounds apparently recognises this, but only aims at removing macroscopically devitalised tissues, and in doing so inflicts a fresh trauma liable to reinfection.

14. For this we propose to substitute the Reading bacillus in a living form, and it is probably present in most of the wounds if only given a chance to carry on its functions. These are directed towards the removal not only of the grossly damaged tissue, but it succeeds also in attacking the microscopically damaged structures. As a result the body forces are freed from the constant menace of septic poisoning, thus allowing them to begin the work of repair.

15. We give examples of gunshot wound cases which have been treated in various ways previously, including the salt-bag method, but without success. These, however, on being sown later with living cultures of the bacillus, have immediately started to do well and have ended in rapid recovery.

16. The organism is probably present in the larger number of infected wounds, but requires more or less anaerobic conditions before it can come into play.

17. These are provided by the pack method of treatment, but we are inclined to think that salt is not a necessary adjuvant

and plays a very small rôle, if any. This seems indicated by the fact that an inert substance like sphagnum moss for packing gives equally good results.

18. It is essential, however, that the wound be thoroughly well laid open in the first instance, exposing every pocket and sinus, so that the packing may completely fill the wound.

19. We are conscious that many subsidiary points have still to be worked out, and even some of the above statements may have to be modified. We feel, however, that the underlying principles are sound and offer a true explanation of the phenomena which have been described by those who have used salt bags. It sounds heresy to advocate the introduction of living organisms to a wound, and, above all, anaerobic spore-bearers, but it has been done with success by us. In view, therefore, of the urgent needs of the moment, we offer these results of our investigations, carried out amidst much routine work, as we feel convinced that a knowledge of them will lead to further developments, and such knowledge ought to be shared *now* with others who may have opportunities for the investigation of a larger number of wounds than we have.

20. Further investigation is proceeding, and it is hoped that we shall be able to make a communication later.

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LIQUID-TIGHT CLOSURE AND THE TREATMENT OF WOUNDS.

BY WALTER H. TAYLOR, M.D., C.M. TORONTO,
AND
NORMAN B. TAYLOR, F.R.C.S. EDIN.,
CAPTAINS, C.A.M.C.

IN the summer of 1916 convoys arrived at base hospitals in France with many bad-looking wounds, their dressings dried and caked owing to suspension of treatment during transit. With free incision, the employment of drainage-tubes, and a solution of eusol, the majority of these wounds did well. Too often, however, they failed to respond, and in these cases post-amputation dissection indicated that crevices of the wound had not been reached by the solution.

At that time we had not heard of Carrel's method, but the importance of bringing fresh solution in contact with as large an extent of the wound cavity as possible seemed obvious. To this end we thought of creating an ebb and flow in the wound by repeatedly filling it under pressure and allowing the fluid to escape. A catheter was inserted having a hole about its middle discharging in the centre of the wound and its lower end tied off. The escape of fluid was obstructed by plugging the wound openings with gauze. Irrigation was regulated by a clip on the tube connecting the catheter with a reservoir.

Distension of the wound occurred during flow, followed by leakage and collapse of its walls when the flow was stopped, thus furthering the mixing of fluids in the wound much as the interchange of gases is promoted in the lungs by the act of breathing. In a sense the wound was made to breathe.

This "tidal movement" in the wound we regard as important. It is essentially a cleansing action. A nurse employs it in rinsing a sponge by squeezing it in a basin of water. In wounds whose ramifications are many and tortuous this plan is particularly efficacious and, in our hands, has given excellent results.

Closely associated with this washing of the wound is its ventilation. Many surgeons leave wounds open to the air for this purpose. It is to be remembered, however, that air or oxygen makes contact with the tissues only through the medium of fluids. Exposing a deep wound to the air is of little avail unless air-containing fluids are made to penetrate its depths. This precisely is what tidal flushing does.

These first cases in which we plugged the wound openings with gauze made notable recoveries. But the expenditure of fluid was excessive, resulting in troublesome leakage into the dressings and thence into the bed. The value of the procedure was appraised correctly by a nursing sister, who remarked that the cases did well enough, but that the mattresses were ruined.

Carrel obviates much of this by using small-calibred tubes and by apportioning the amount of fluid injected to the size of the wound. But the user of this method is on the horns of a dilemma—if too much fluid is injected he will have leakage and wet beds to contend with; yet if he does not use "too much" he cannot be certain that the fluid is coming in contact with the whole interior of the wound. It requires tension in the wound for this, and tension spells overflow. Moreover, such careful regulation of the fluid in the absence of any convenient means of flushing the wound encourages the accumulation of pus and débris which blocks the tubes, necessitating frequent dressings. On ambulance trains the multiple-tube method of irrigation is at a greater disadvantage.

From these considerations, then, tension in the wound being necessary if tidal movements are to be had, and tension being impossible without closure, it appeared to us that some trustworthy system of watertight closure was needed in the treatment of wounds.

The First Device: its Mode of Use.

This object was first attained by means of a rubber bag after the pattern of an ice-bag, shown in cross section (Fig. 1). A soft rubber collar is formed in the centre of the "top-sheet" T. This collar is closed by the clamp M. Fitted in the wall of the collar is a glass cannula whose end outside the collar is connected with the inflow tube, and its end within the collar, with a tube leading to the bottom of the wound.

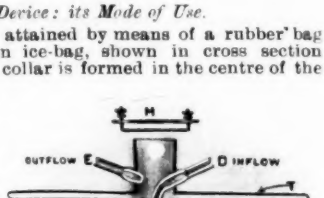

FIG. 1.

Another cannula, similarly fitted in the wall of the collar, has the outflow attached to it. The under side B, the skin-sheet, is of very thin rubber. It adheres to the skin around the wound, a hole having been cut in this sheet a little larger than the wound opening, through which the wound cavity communicates with the interior of the bag.

The wound is prepared by passing strips of rubber into any pockets that exist. Their outer ends are tied together and cut flush with the skin. These act as props to keep passages open, so that a positive pressure in the main channel of the wound becomes transmitted easily to deeper parts. The rubber tube which is to be connected later with the proximal end of the inflow cannula is now passed to the bottom of the wound. The skin is dried and painted with a solution of Canada balsam and rubber. The drainage-bag is then applied, the surgeon being able to see through the open collar that the hole in the skin-sheet is registering round the wound. The tube in the wound is connected with the inner end of the cannula whose outer end connects with the inflow tube. The outflow tube is connected with the outer end of the other cannula. Both sides of the bag are then bandaged together and to the limb, leaving the collar protruding. During irrigation the fluid extravasates between these sheets, exerting pressure which holds the skin-sheet down, the bandages serving as a *point d'appui*. The sheet of rubber cemented to the skin round the wound constitutes a stop-valve, preventing leakage, any attempt of the fluid to escape beneath it being countered by its own pressure upon it. When the outflow is clipped tension occurs in the wound relative to the height of the reservoir. When the inflow is clipped siphonage creates negative pressure which is relative to the column of fluid from the bed to the floor.

Report of Cases.

Over 20 cases have now been treated with one form or another of this device with gratifying results. Many of the wounds treated were shallow and uncomplicated by crevices, but we have selected the following six cases for the opposite reason:—

CASE 1.—Corporal L——, admitted to Granville Special Hospital. Excision of the knee had been performed following septic infection of the joint. For 12 weeks the discharge was most profuse. Latterly the condition was less acute, but the sinuses, which communicated with one another, one on the anterior aspect of the knee and one on each side of the tibial tuberosity, were most intractable to treatment. The tissues for the last six weeks had been tender, indurated, and swollen. The temperature at this time was normal, except for an acute "flare up" every few days accompanied by a sharp rise. Ordinary irrigation and moist dressings had been used for weeks with scarcely any change. The drainage-bag was applied and the patient shown how to control the flow himself. Eusol solution was run in and out for a few seconds every half hour. After 24 hours, on opening the collar of the apparatus to

examine the wound, it was found that no pus could be expressed from the opening of, or along the track of, the sinus. The tissues were healthier-looking and less tender to the touch. The patient, who had complained of a dull aching pain in the joint from the first, now volunteered the information that this had entirely disappeared. The apparatus was removed on the fourth day, when a few drops only of serous discharge could be expressed from the anterior sinus. The two lateral openings which communicated with the anterior were healed a week after the bag was removed, the anterior sinus exuding serum only for a week or ten days longer. No recurrence of the infection occurred and a month later he was able to bear weight on the limb.

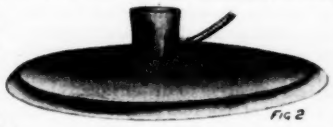
FIG 2

CASE 2.—Private J——, admitted to Ontario Military Hospital with a badly infected compound comminuted fracture of the left thigh and a tunnel wound through the upper end of the right tibia, also badly infected. The patient was in a "typhoid state" with involuntary fæcal movements. The left thigh was amputated shortly after his arrival, and at the same time the wound through the tibia was curetted and spoonfuls of black, foul-smelling, cancellous tissue removed. The end of the tibia appeared so friable that there was danger of breaking into the joint. A split tube was passed through and through, a drainage-bag applied to each opening and irrigation instituted with pressure of a 3-foot column of fluid—Dakin's solution. The device remained effective for three days and was not reapplied. Treatment was continued by merely flushing the solution through the wound. It is difficult to draw deductions in this case on account of the accompanying condition, but this ominous-looking wound took the right course instead of the wrong one, the patient made a good recovery, and he will have a good right leg, as infection did not extend to the knee-joint.

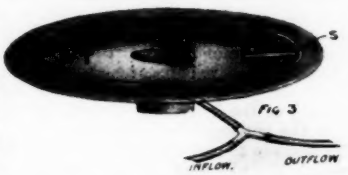

FIG 3

CASE 3.—Private S——, admitted to Granville Special Hospital with large discharging wound of thigh. Very little improvement had been noticed in the past four weeks. There was a deep sinus leading into soft tissues surrounded by an area covered with dirty greyish granulations discharging freely. A drainage-bag was applied for seven days and eusol introduced under pressure every half hour during the day and every hour at night for the first 48 hours. On removing the bag there was scarcely any discharge from the sinus, and the granulating surface was clean. Moist dressings were then applied daily. In three days the sinus was closed and the surrounding area filling in rapidly with healthy granulations.

CASE 4.—Sergeant ——, admitted to Granville Special Hospital with wound of upper arm, which had been discharging for the past six weeks with scarcely any change. There was no sequestrum or foreign body. Tortuous sinuses extending above and below the wound were indurated, tender, and of a purple colour. The wound recently had become acutely inflamed, the tissues around much swollen and discharging profusely; the evening temperature was 102°. Hot fomentations and ordinary irrigation produced little alleviation of these symptoms. The drainage-bag was applied and hot hypertonic saline introduced every half hour under pressure, the patient controlling the flow himself. In 12 hours he was entirely free from pain, whilst tenderness and swelling were markedly reduced, the temperature was normal that same evening. After two days the fluid came away clear, though the intervals between irrigations had been increased. The bag was removed on the fourth day, all induration, redness, and tenderness having disappeared, the wound showing only a small amount of sero-purulent discharge. A week later the sinuses were closing well, they were perfectly pliable and free from œdema, a condition which had not obtained since his original infection.

CASE 5.—Private S——, admitted to Ontario Military Hospital with compound incomplete fracture of the femur. There was a wound three inches in diameter on the anterior surface of the thigh leading to the medullary cavity through a hole in the bone. The thigh was tremendously swollen and very painful to the touch. There was profuse discharge, dirty brownish red in colour. The patient's general condition was fair, pulse quickened, temperature 101°. The surgeon in charge of the section thought possibly it was a form of gas infection, and advocated multiple incisions of the limb, but consented to give this scheme of drainage a short and summary trial. In two days the swelling had practically disappeared, the discharge was lessened in amount and changed in character to a creamy-coloured pus. Both temperature and pulse had improved, the case having lost the aspect of an acute condition.

CASE 6.—Sergeant ——, admitted to Granville Special Hospital with compound fracture of the femur and over-riding of the fragments. There was a sinus on the outer aspect leading inward between the fragments, also a wound below this leading into a large abscess cavity. Both these wounds had been discharging profusely for six weeks or more. The whole thigh from the lower third to the anterior superior spine was greatly swollen, tender, and œdematous. The temperature ranged between 99° in the morning to 101° at night, pulse 118 to 120 per minute. The patient was despondent, irritable, and thoroughly miserable. Latterly eusol had been injected into the sinuses, but without pressure, the fluid returning as easily as it went in. The temperature dropped to about 99° in the evening, but did not fall below 99° in the morning, and there was little if any change in his pulse-rate or in his general condition. The drainage-bag was then applied covering both wounds and the solution introduced, alternating positive with negative pressure. Clipping off the waste-tube caused the collar of the bag to balloon up, whilst clipping the inflow caused its sides to suck vigorously together. We inferred that, to some extent, the same thing was happening within the wound itself and, to a lesser extent, in the remotest reaches of the wound—i.e., tidal movements. For the first 24 hours drainage was free, the fluid coming away loaded with pus. At the end of 24 hours the evening temperature was normal for the first time for over six weeks. The induration, tenderness, and swelling were reduced to a remarkable extent at this time. At the end of 48 hours the fluid came away comparatively clear after each half-hourly renewal of the solution. On the third day, owing to blockage of the sinus, there was a sharp rise of temperature and pulse-rate, which as rapidly subsided when the obstruction was removed. Two days afterwards the bag was taken off, the temperature was below normal, pulse 80 per minute, and only a small amount of serous discharge exuded from the wound. The swelling, pain, and tenderness of the thigh had entirely disappeared; the tissues were perfectly pliable and could be pinched up anywhere with the fingers. Four days after the removal of the bag the lower wound was quite closed; the upper wound closed a week later. The immediate improvement in the general condition, mental outlook, appetite, and well-being of this patient was little short of astounding. His pulse-rate, which had been running from 116 to 120 per minute for over six weeks, dropped to 72 in a week from the commencement of the treatment. There has been no recurrence of the infection.

These cases at least are suggestive in view of the reasons propounded why "active" irrigation should be more effective than "passive." Theoretically, the more inacessible the infection the more definitely should this plan disclose its relative worth. And the theory appears to have been vindicated by the clinical course of cases with tortuous sinuses leading down to fractured bone. The success of Carrel's method is due to the better distribution of the solution. Liquid-tight closure enables us to bring the fluid even more completely still in contact with the tissues.

Improved Form of the Device.

The device (Fig. 1) that we have used in these cases stays watertight from three to five days at a time, after which its removal, and its reapplication if the wound is not sufficiently sterile, is necessitated by leakage. This is inconvenient, since the rubber is still quite adherent to the skin, except along the track of a radiate wrinkle which has formed very gradually and through which the fluid escapes.

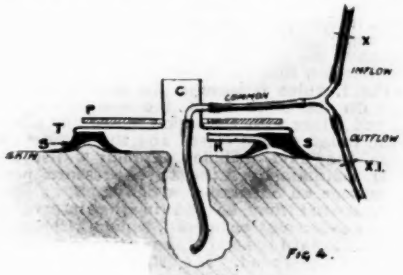

FIG 4.

But the apparatus as we have it reconstructed now is much more dependable, easier to apply, and the period of its effective use has been extended indefinitely.

Fig. 2 is a perspective view of the top side of the device. Fig. 3 shows the under side. Fig. 4 is a sectional view, and Fig. 5 shows the device as it appears when bandaged to a wounded thigh.

The same letters refer to the same parts. The collar C and the top-sheet T are practically the same as before. Instead of the skin-sheet we have the "suction ring" S attached to the circumference of the top-sheet. Round the under surface of S a gutter is formed, the sharp rubber lips on either side of which are designed to grip the skin. A small tube, K, leads from the gutter to the space beneath the collar. A valve on this tube lets air pass from the gutter and holds the suction by blocking its return. The drainage-tube from the wound connects with a cannula in the collar, whose outer end connects with a common tube. This common tube divides into an inflow and outflow a few inches from the collar by means of a Y-piece. There is a clip, X, on the inflow, and another clip, XI, on the outflow.

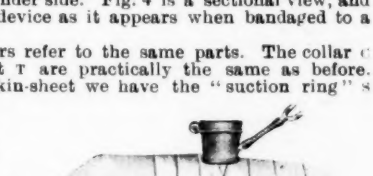
FIG. 5.

To apply, first paint the skin with a mixture of petrolatum, Canada balsam, and rubber dissolved in ether. Petrolatum alone serves very well, but it attacks the rubber. We do not want to cement the rubber to the skin as before, but merely to provide a "filling" to obviate the possibility of capillary leakage and to protect the skin. These ingredients in equal parts make a soft elastic paste that is not too sticky. The device is laid on so that the suction ring rests on sound skin with the wound more or less in the centre. The washer P, of plastic felt, is now moulded to the suction ring and pressed down all round until the rubber lips make contact everywhere with the skin. When the felt has hardened a little cotton may be tucked between it and the ring wherever contact of the lips is not perfect. The ring is very flexible, and its attenuated lips can easily be made to conform to an irregular surface. When the bandage is applied over all the air which is thereby expressed from the gutter through the small tube K cannot return on account of the valve. Thus we have suction operative in addition to the pressure of the bandages, even before the irrigation is started. After connecting the drainage-tube to the cannula the collar is closed.

To flood the wound close the outflow, when the fluid overflows and extravasates into the space between the top-sheet and the top of the suction ring. Here the pressure operates to force the suction ring against the skin, using the bandaging as a *point d'appui* as before. This is additional to suction beneath the ring, which is still maintained by the valve.

To suck the wound out, close the inflow-tube and open the outflow, when siphonage aspirates the wound, collapses the collar, and renews the negative pressure beneath the suction ring through the tube K.

When flooding a wound under pressure leakage is blocked by the same forces which, when a bath is filled, operate to draw the plug to the mouth of the waste-pipe and hold it there—the weight of water above the plug and the column below it acting simultaneously.

Several alternative procedures may be adopted in the intervals between the irrigations. On the one hand, the wound may be left distended, either with the outflow closed and the inflow open or the outflow almost closed and the inflow open, in which case the fluid dribbles slowly through the wound while positive pressure is maintained. (If it is desired to have the flow thus continuous the connexion of the in- and out-flow tubes with the collar will need to be as shown in Fig. 1, which is perhaps the best arrangement in any case.) On the other hand, the wound may be left collapsed, and either with the inflow closed and the outflow open or the inflow almost closed and the outflow open, in which case the fluid dribbles through whilst negative pressure is maintained. A negative pressure persisting should encourage an outward flow of lymph.

Or a dry wound may be had in the interval. After siphonage the collar may be opened, when air replaces fluid as it gravitates toward the end of the drainage-tube which is at the bottom of the wound. The grip of the suction ring on the skin may be released by lifting the outer lip to permit the entrance of air.

If the wound is a through-and-through one a similar device with its tube K, but unprovided with a collar, is applied to the lower opening. Its suction ring is influenced, too, by negative pressure in the wound.

Criticisms Answered.

An objection that is often raised is that the wound is sealed. In the intervals between the irrigations, it is true, fresh fluid with its quota of oxygen is locked within the wound. But the tissues can suffer no ill-effects from this before the contained fluid becomes appreciably vitiated, which takes time. And since bed flooding places no limit to the frequency of the irrigation, and the manipulation of a clip is all that it entails, it might at least be given often enough to obviate this objection. Besides, as just explained, the fluid may be allowed to dribble through the wound during the intervals between the flushings.

Another contingency suggested is that separation of muscular planes, injury to the tissues, pain, &c., might result from pressure of fluid in the wound. Of course, pressure may be reduced to the vanishing point if desired, by lowering the reservoir. But we are inclined to lay stress on the value of pressure.

Taking pain as the criterion of the injury that pressure is inflicting, our experience has been that when the limb is snugly supported by bandages a four-foot column of fluid may be borne without discomfort. Nor have we found that any ordinary pressure is competent to separate muscular planes, and certainly not without pain as a warning symptom. It goes without saying that pain is not allowable in any case.

If pressure in a wound causes injury it must do so not by direct compression of the tissues but by distension—actual stretching of the walls of the wound. It is distension certainly that causes pain, for it is not found that submersion of an inflamed member to a depth of two or three feet produces pain. The larger the wound cavity the greater the area exposed to a given head of pressure, and the more forcibly the tissues are stretched by it. Bandaging checks undue distension of the larger spaces of a wound, yet allows the fluid to enter subsidiary crevices in which infection is prone to lurk, yet which on account of their diminutive size are less sensitive to distension.

Mouths of pockets may have become agglutinated; and it is, we think, the disintegrating action of pressure and suction that carries the wall and allows the solution to penetrate, rather than the action of pressure alone. This "activity" of the irrigation promotes the mechanical washing of bacteria from the wound, and may explain the rapid clearing up of certain wounds which we have observed from the employment of solutions whose antiseptic value is negligible.

Another theoretical fear is that protective barriers might be broken down, causing the infection to spread. The answer to this is that it has not done so, that, on the contrary, infections have been rapidly controlled. The positive pressure in the wound is momentary. In the intervals between the irrigations negative pressure should facilitate an outward flow of lymph. Yet the volume of fluid used and the frequency of the irrigations should maintain the concentration of the antiseptic unimpaired.

We hesitate to call this a modification of Carrel's method, of which already there have been too many. It is true nevertheless that the use of our device implies no departure from his teachings. On the contrary, it allows the doctrine of prolonged and intimate contact with every portion of a wound, by a solution whose concentration remains constant, to be more consistently applied.

Summary.

This whole question seems full of interest, and of promise for the treatment of wounds. Tentatively, at least, we may summarise its advantages as follows:—

1. Alternate tension and collapse in a wound providing deeper penetration of the solution employed and more perfect oxygenation of the tissues.
2. A constant degree of concentration of the solution in the wound.
3. More thorough mechanical removal of pus cells and bacteria from the wound.
4. An outward flow of lymph.
5. Economy of time and effort with ability to irrigate wounds more frequently.
6. Elimination of the personal equation, the height of the reservoir and the opening and closing of a clip comprising practically all the instruction to be given or remembered.
7. Inspection of the wound without undoing the bandages, by simply removing a clamp from the collar.
8. The possibility of keeping an absolute record of the progress of an infection. The washings of the wound for any given period containing all the pus cells and bacteria collected by the wound during that period, which could be counted and compared with any subsequent period.
9. Saving of material—gauze and cotton—should more than counterbalance the cost of the device, which could be used over and over again.
10. Comfort and sense of dryness enjoyed by the patient.
11. For obvious reasons it would appear to offer an ideal method of treatment for use on ambulance trains.
12. It is not suggested that this device should be employed in the shallow type of wound, where the ordinary methods suffice, but in wounds that are deep and inaccessible. It would seem to promise most in compound fractures of the femur.

We wish to express our gratitude to Surgeon-General Foster, C.B., Director of Medical Services, Canadians, for the facilities accorded us to carry out this work, and to Lieutenant-Colonel G. E. Armstrong, consultant to the D.M.S., whose interest in our scheme has been most helpful. We are indebted likewise to Colonel D. W. McPherson and to Lieutenant-Colonel J. T. Clark, the officers commanding respectively the Ontario Military Hospital and Granville Special Hospital, for permission to report these cases.

AN OPERATION FOR THE RADICAL CURE OF INGUINAL HERNIA.

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ANY successful operation for the radical cure of inguinal hernia must aim at re-forming the damaged inguinal canal, making it "narrower and more resistant to abdominal pressure than the original canal had been."[1] The operation I am about to describe has the additional aim of re-forming the stretched internal abdominal ring.

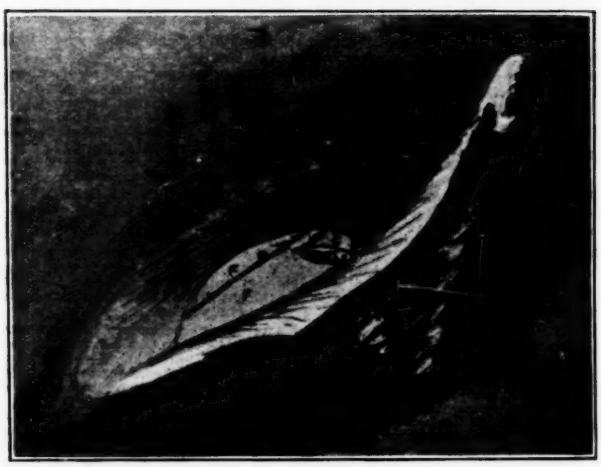
I should like, first of all, to refer to a few important points in the normal and pathological anatomy of the inguinal region.

In the inguinal region the fascia transversalis stretches from the lower border of the transversalis muscle to Poupart's ligament to form the fascial floor of the inguinal canal. Half an inch above the mid-point of Poupart's ligament the spermatic cord leaves the abdomen surrounded by the infundibuliform fascia. Normally a small well-defined ring can be demonstrated where the infundibuliform fascia leaves the fascia transversalis. This constitutes the internal abdominal ring. During abdominal strain the strong internal oblique muscle supports this fascial ring and reinforces the fascial floor of the inguinal canal.

The pathological conditions accompanying a hernial protrusion are: 1. A stretching of the fascial internal abdominal ring and fascial floor of the inguinal canal. The ring enlarges in an inward and upward direction until it eventually overlaps the external abdominal ring. 2. A resulting upward displacement of the muscles which are inserted into the conjoined tendon. 3. A stretching of the aponeurosis of the external oblique.

In the present writer's opinion the importance of repairing the defect in the fascia transversalis in an operation for the radical cure of an oblique inguinal hernia has never been fully appreciated. In this region, as elsewhere, the fascia transversalis must be looked upon as part of the extraperitoneal fascial envelope of the abdominal cavity. A postoperative defect in this fascia, especially if it be left unsupported by strong muscles, invites a hernial protrusion. Therefore any operation which leaves a large or unsupported defect in the fascia transversalis or interferes with the support which the internal oblique muscle normally affords in the inguinal region must fail.

FIG. 1.



A, Black dotted lines indicate edge of transversalis muscle. B, Dotted ring in position of internal ring. C, Cord, &c., cut away to show underlying structures. D, Line of incision in fascia transversalis. E, Conjoined tendon. F, Fascia transversalis. L, Fascia lata.

[1] Binnie: Operative Surgery.

Description of Operation.

1. The inguinal canal is exposed as in Bassini's operation.
2. The sac is dealt with.
3. The cord is freed from its bed and retracted.

FIG. 2.

A, Cord, &c., retracted with gauze. B, Internal oblique muscle retracted showing lower edge of transversalis muscle and fascia transversalis. CCC, Fascia transversalis. D, Extraperitoneal fatty tissue.

4. The weak fascia between Poupart's ligament and the conjoined tendon is picked up with forceps and divided parallel to Poupart's ligament, care being taken not to injure the deep epigastric vessels.
5. The fascia transversalis is freed thoroughly from the retroperitoneal fatty tissue both upwards under the conjoined tendon and downwards to expose the deep aspect of Poupart's ligament.
6. The fleshy arch of the internal oblique muscle is retracted, and forceps applied to the glistening fascia on the deep aspect of the conjoined tendon so as to draw it into the wound. This fascia brings with it the lower aponeurotic portion of the transversalis muscle.
7. Mattress sutures (three or four generally suffice) are used to approximate this fused fascia and aponeurosis to the deep aspect of Poupart's ligament. The outermost suture is introduced first. Its aim is to restore the fascial internal abdominal ring, placing the restored ring under the supporting fibres of the internal oblique muscle. By carefully retracting Poupart's ligament forward and passing the needle from within outwards, to emerge where Poupart's ligament blends with the fascia lata of the thigh, these sutures are easily and safely introduced. It is also important that the remains of the fascia transversalis still adherent to Poupart's ligament and the cord should not intervene between the structures opposed. This is easily avoided if this fascia is retracted forwards with Poupart's ligament. When tying the mattress suture nearest the internal abdominal ring care must be taken not to narrow that ring unduly. I have never seen pressure symptoms, although in most of my cases the re-formed internal abdominal ring will barely admit the tip of one finger.
8. The cord is allowed to fall back into its bed.
9. The external oblique aponeurosis is stitched up.
10. The wound is closed.

BLOOD PRESSURE AND SURFACE TEMPERATURE IN 110 CASES OF SHELL SHOCK.

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THE cases were Expeditionary Force men, and the examination was made on admission and at regular intervals through the man's stay in hospital.

Observations on Blood Pressure and Condition of Patients.

It was found that 55 men showed on admission a pressure below 120 mm. Hg, and of these 25 were between 88 and 110. These were the severe cases of shell shock. Of the other 55, 28 were between 130 and 150 mm. Hg, and 27 between 120 and 130. Of those above 130 only 4 were severe cases. With the exception of 8 men, all showed subnormal surface temperature, varying from 18° to 31 5° C. The temperature was taken in the hand with a surface temperature thermometer, the temperature of the air and a healthy control being noted at the same time.

All of the cases with a very low blood pressure were suffering from dreams which woke them in a state of terror, sweating, and trembling. Their hands were dusky and clammy, and most of them had a tremor. They showed a marked fatiguability and irritability; most of them were depressed and showed a great lack of self-confidence and initiative; all suffered from headache. On admission nearly all had dilated pupils.

Of the men with a blood pressure above 120 only 10 complained of nightmares, and in these the signs of fear were not so well marked as in the cases with a low pressure. In all cases, whatever the blood pressure, headache was a common symptom.

An improvement in the general condition was coupled with a gradual rise of pressure. This is shown in Chart 2, which is a typical example. At the same time the dreams became less terrifying and there were fewer signs of fear. In some cases which had shown a return of symptoms—such as nightmares, tremors, headaches, or had some cause for considerable worry—it was found that there was a drop in blood pressure at the same time. This is also shown in Chart 2. In most cases there was a rise of surface temperature as the general condition improved, though any subsequent fall in surface temperature or blood pressure did not always coincide.

No case showed any organic lesion, and the urine was normal.

As a gradual rise in blood pressure was found to coincide with general improvement in condition, pituitary and thyroid extract were given in order to see whether a general improvement could be obtained more quickly.

An interesting point was the almost constant relationship between the low blood pressure and terrifying dreams. It seems as though the vaso-motor disturbance which was produced at the time of the shock was rendered more or less permanent by the constant repetition in dreams of his former terrifying experiences. At the same time the low blood pressure caused a cerebral anæmia and lessened mental and physical activity, which prevented the man from throwing off the effects of his imagination—thus a vicious circle being produced. A gradual or rapid rise of blood pressure in nearly every case was accompanied by a change in the character of the dreams, the terror element being less marked.

Results of Treatment.

Treatment with pituitrin.—This was tried after general treatment and other drugs had failed. Twenty cases were treated with pituitary extract: 15 were watched for some weeks; 5 improved very rapidly and were sent to convalescent homes before full notes could be taken. Chart 1 shows progress in 10 cases.

It was given (1) as pituitary fluid 0·5 c.c. b.d. as an injection; (2) as ext. pituitrin gr. ii. t.d.s. Better results were obtained from extract. Five patients who were given injections complained of dizziness afterwards; no case treated with extract complained. Administration was followed by an immediate rise in blood pressure—in one case from 100 to 122. There was a marked improvement in appearance, less depression, less headache, greater feeling of well-being, less fatiguability. Eight cases complained of polyuria (5–6 pints of urine a day). The pituitrin was discontinued until the amount of urine became normal, and then was given once a day.

A slight drop in blood pressure was noticed in 6 cases when pituitrin was discontinued, but not to the original level.

Three of the most marked cases were given other pills instead of pituitrin for 2–3 days to eliminate suggestion as a cause or factor in the improvement. In 2 cases there was a slight return of headache, and the men did not feel so well.

The pituitrin was given to one man with a blood pressure of 150 who was suffering from marked depression, headache, insomnia, stammer, and nervousness. After three doses the headache and depression were markedly improved; he showed more self-confidence; his blood pressure dropped to 130. He attributed the improvement to the new treatment, and when the supply of pituitrin gave out it was noticed that he relapsed. The drop in blood pressure was not noticed in any other case, and this case is merely quoted because it was unique.

Treatment with Thyroid Extract.—This was given in doses measuring from gr. ¼ to gr. i. t.d.s. to 20 cases. In 13 cases improvement was noticed, a gradual rise in blood pressure and lessening of headache being produced. Coupled with pituitrin the effect was more rapid.

No other gland extracts have been used.

Histories of Cases A to K (explaining Chart 1).

A.—Lance-Corporal R. H., aged 26 (also Chart 2). Out to France February, 1916, feeling very fit. On July 1st he was blown up by a shell. He has a faint recollection of crawling out of some water, but remembers no more until he found himself in a dug-out, dumb, partially deaf, and blind for a few minutes.

When admitted to Maudsley Hospital on August 17th he was mute, his hearing was normal; there was slight left facial paralysis. His hands were very dusky, sweating, cold, and slightly tremulous. His dreams were very marked; he used to wake sweating and terrified after going through a pantomime of bomb-throwing. He had headache and was depressed. Blood pressure and surface temperature were subnormal; he was always complaining of feeling cold.

Sept. 25th: He was able to speak in a whisper. His other symptoms were improving slowly. His dreams were still frequent but less terrifying.

Nov. 25th–28th: All his symptoms returned, after hearing of the death of his brother in action. Put on ext. pituitrin gr. ii. t.d.s. This was followed by an immediate rise in blood pressure, together with marked general improvement, less headache and depression. His bomb-throwing still persisted, but he was much less exhausted on waking. After seven days' treatment his surface temperature began to rise, and he himself noticed that he was much warmer.

Pituitrin was discontinued after one month's treatment, but the improvement persisted.

He was boarded out of the Army in February, and wrote in March saying that he was still feeling better.

B.—Sergeant J. K., aged 34. Blown up by a shell in November, 1916. (Had been in India in 1908 and suffered from malaria.) On admission he complained chiefly of supraorbital and vertical headache, together with dizziness. His blood pressure was 104, and dropped to 92 when he was put on pituitrin. There was an immediate improvement in headache; blood pressure rose to 98. There was polyuria (6 pints), and the dose was given once a day only. The headache continued to improve, and he was sent to convalescent home and later to his depôt.

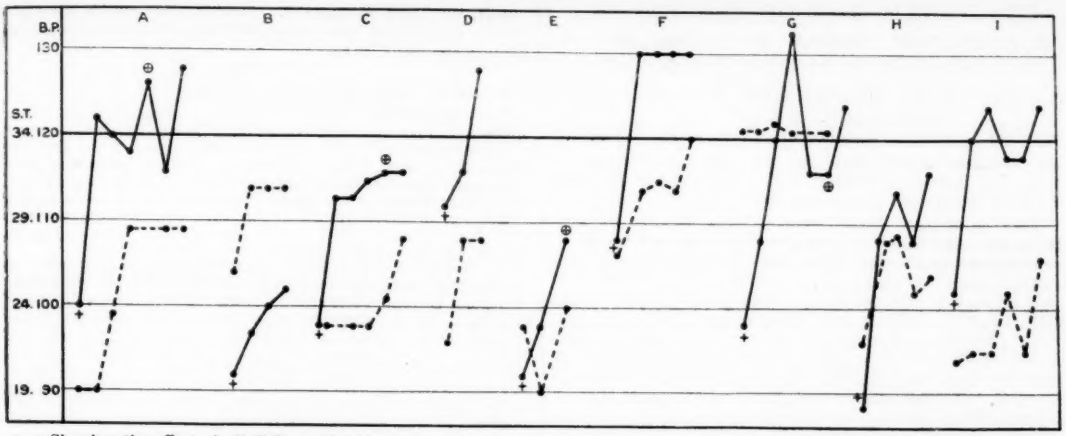
C.—Gunner J. W., aged 25. In October, 1916, while helping to lift ammunition, fell down with severe pain in lower part of back. On admission to Maudsley Hospital he complained of severe occipital and temporal headache. He was troubled with nightmares and was very neurasthenic. While in hospital he became tremulous on excitement and his headache increased. He was given pituitrin, which raised his blood pressure from 98 to 114 and improved the headache. The blood pressure remained up when the pituitrin was discontinued, but he remained neurasthenic. Boarded out.

D.—Gunner D., aged 22. After 28 months' service in France he was buried in a dug-out, when his gun blew up in October, 1916. On admission he had marked vertical headache, his hands were dusky and tremulous, and his pupils were widely dilated. He had nightmares. After one week's treatment with pituitrin his headache was much improved. Sent back to depôt.

E.—Private D. B., aged 19. Patient had to go sick as result of barrage on Nov. 18th, 1916. On admission he had cold blue hands, sweating body, feeble pulse, blood pressure of 92, terrifying dreams as soon as the light was put out at night. His general condition improved with pituitrin, but the supply gave out and he was sent to convalescent home.

F.—Private T., aged 29. Admitted to Maudsley Hospital in July, 1916, after being blown up on July 1st, with marked tremor, general exhaustion, and signs of fear. He had seen service in Gallipoli, Egypt, and France. Patient improved up to the end of July, and then he began to be troubled by nightmares, chiefly of aerial torpedoes. His state of fear was very marked and persisted until the end of September, when he began to improve. He was better up to November, when he became much worse. He complained constantly of headache, his sleep was disturbed by nightmares, and he had loss of appetite. His blood pressure was 98–103. After pituitrin there was immediate improvement. Sleep, appetite, and general condition all improved. Dreams persisted, but were less worrying. In this case the supply of tabloid form gave out, and he was given injections. He complained of dizziness after these, and it was noticed that he was much better after the solid form.

CHART 1.



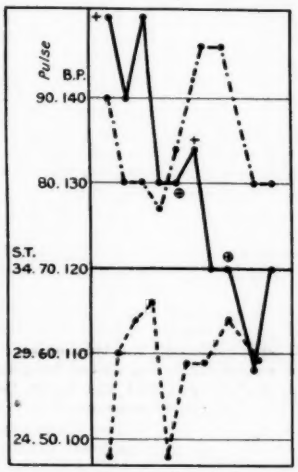
A—I Showing the effect of pituitrin on the blood pressure and surface temperature. Each dot is one week's interval. + is the pressure when the first dose was given. ⊕ is the point at which the pituitrin was discontinued.

G.—Private N., aged 35. Admitted to Maudsley Hospital in April, 1917, suffering from amnesia for whole of Army life, depression, marked occipital headache, and slight confusion. He was put on pituitrin after general treatment had failed. There was an immediate rise in blood pressure, together with a marked lessening of his depression and general debility. He complained a little of dizziness after injections and had polyuria (5 pints), and was given extract instead of injection. The amnesia persists, but the general condition is still improving.

H.—Private D. H., aged 26. Suffering from acute confusional insanity following mumps and measles. Family history of insanity. Blood pressure only 88. Hands, nose, ears, and feet very blue and cold. He was given pituitary fluid with an immediate rise in blood pressure and slight general improvement. Ten days later he was given pituitary and thyroid extract, but there seems to be no real improvement. (There has not been sufficient time to watch for any further change.)

J.—Sergeant I. L., aged 22. Sent back from Germany, where he had been prisoner for 15 months as "insane." He was in Giessen Asylum for 7 months. August 16th, 1916: Admitted to Maudsley Hospital, markedly depressed and lethargic. In October his general condition showed improvement, but he still had periods of depression. He was put on thyroid extract, and in December he was given pituitrin. January, 1917: No longer depressed or lethargic. (He complained of pain in his back, which was found to be due to a bullet; this was removed.)

CHART 1, K.



Shows the effect of pituitrin in a case of high blood pressure.

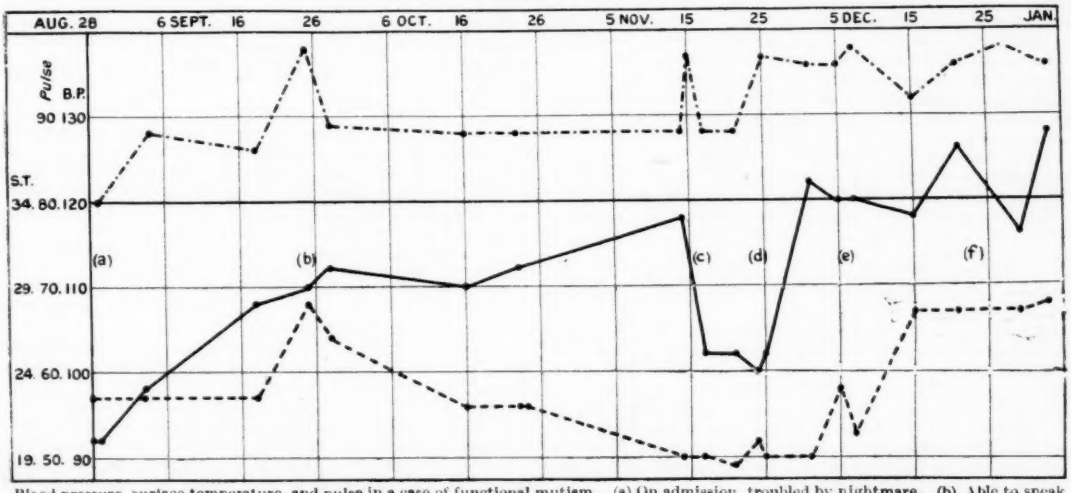
——— = Blood pressure.
– – – = Surface temperature.
·—·—· = Pulse.

K.—Bombardier A., aged 31. Admitted to Maudsley Hospital on Oct. 30th, 1916, after 19 months' active service, suffering from headache and depression. Blood pressure 150. He had similar attacks before joining Army. Patient's headache did not improve under treatment, and on Dec. 3rd he was given extract pituitrin, in spite of his blood pressure. In two weeks the blood pressure dropped from 150 to 130, and there was less headache and depression, and more self-confidence. Treatment was discontinued for one month, and during this time patient again became depressed and tremulous. Pituitrin was again given with improvement. Blood pressure 120. Sent to convalescent home.

In this case extract pituitrin improved the headache, and was accompanied by a drop in blood pressure and polyuria.

The work was undertaken at the suggestion of Major F. W. Mott, R.A.M.C.(T.), who had already made some observations on the same subject, and who was in charge of the men, and to whom I am indebted for help and permission to publish the results. The instrument used was Rogers's sphygmomanometer, manufactured by Short and Mason, Limited. It was found that this could be manipulated more quickly than the Riva Rocci instrument, which was used for a time and from which the same results were obtained.

CHART 2.



Blood pressure, surface temperature, and pulse in a case of functional mutism. (a) On admission, troubled by nightmare. (b) Able to speak in a whisper. (c) Much depressed after bad news. (d) Put on pituitrin. (e) Marked general improvement. (f) Taken off pituitrin.

FRACTURED BASE OF THE SKULL:

THE SUBSEQUENT HISTORY OF A CASE AND ITS TERMINATION 24 YEARS AFTER THE ACCIDENT.

BY J. B. CHRISTOPHERSON, M.A., M.D. CAMB., F.R.C.P. LOND., F.R.C.S. ENG.,

DIRECTOR OF THE CIVIL HOSPITALS OF KHARTOUM AND OMDURMAN.

With Bacteriological Note by ALBERT J. CHALMERS, M.D. Manch., F.R.C.S. Eng., D.P.H., *Director of Wellcome Tropical Research Laboratories, Khartoum.*

IT is not often that we can follow up a case of fractured base terminating 24 years after the original accident from the direct effects of the injury.

One Sunday in March, 1917, I was asked to see an old gentleman of 65 at Khartoum, complaining simply of feeling a little giddy and of some discomfort below the occipital region of the head—nothing more. He had a temperature of 104° F. Next day (Monday) he appeared neither better nor worse. He became unconscious and apoplectic on Tuesday, and did not recover consciousness before he died on Wednesday morning at 6 o'clock.

Account of the Case.

The complete story was this. Nearly 24 years ago (summer, 1893), whilst out riding, he was thrown, and received a fractured skull. He remained unconscious for two weeks, finally recovering, but with the loss of smell and taste. He appeared to recover completely, excepting that any worry or extra exertion made his head ache at the back; this, however, was always put right by a day in bed and the administration of a little aspirin.

He was a popular, pleasant, cultured man, with a good memory, and a well-known artist, who, during the war, had patriotically resumed his former business profession and was actively engaged in it at the time of his death. He possessed all his faculties (excepting taste and smell) until 24 hours before his death. In fact, four days before his death he was apparently in the best of health and spirits, as an active man of 65 should be, and he looked no older than 55, if as much.

At the time of his death he was at Khartoum, a long way from England, the place of his accident of 24 years before. The day on which he was first taken ill would be considered hot for any other place but Khartoum, but not unpleasantly hot for Khartoum at that time of year (the month of March). The maximum temperature on that day was 96·4° F.; the minimum on the previous evening had been 64·8°. He first noticed something amiss after he had walked along from his hotel to the club and back, a distance of over a mile.

At the club he had looked at the papers and had gone to sleep on the verandah. He had walked back in the afternoon to his hotel, but was noticed on his return there to be unsteady in his gait. Feeling unwell, he walked to see a doctor who lived a quarter of a mile away; not finding him in he returned to the hotel and went to bed. He was seen in bed by the doctor at 9 o'clock on the same evening. He had a temperature of 104°F., and the only thing he could definitely complain of was a feeling of discomfort which he located below the occipital region of his head. It is necessary to remember this because subsequently it was found that he was suffering from a small abscess in his frontal lobe. There were no other physical signs of illness, and he talked intelligently and with a good memory for events recent and remote and chatted of mutual friends of 20 years ago.

When seen the next morning he appeared to be neither better nor worse, and it was supposed that whilst sleeping on the club verandah he had got "a touch of the sun." He really was suffering from a cerebral abscess in the frontal lobe and commencing convex meningitis, but this was not suspected at this time.

He was seen at mid-day and again at night. The temperature being no lower (104·8°), it was resolved to take him into hospital in the morning; he had so far only been a little more than 24 hours ill. The next morning at 6 o'clock he became comatose after getting out of bed, and passed into an apoplectic condition, struggling and breathing with considerable stertor and stridor. Ice was applied to his head and he became quieter; he was removed to hospital but he never recovered consciousness.

The only additional symptom noticed was inequality of the pupils, the right being fixed. (The abscess was on the right side.) He died 24 hours later, 84 hours after the commencement of his last illness.

Necropsy.

A post-mortem examination was made.

The whole of the convex surface of the brain and the inner surface, that in relation to the falx cerebri, was invaded by a purulent meningitis which appeared to travel along the line of the big vessels. The medulla oblongata and the spinal cord were quite free and there was no meningitis of the base at all, nor did it extend to the spinal cord, nor was the pus of the gelatinous greenish-yellow appearance which one associates with the meningococcus of Weichselbaum. It was not, in fact, a cerebro-spinal meningitis anatomically.

On getting out the brain there was some difficulty in removing it from the right anterior fossa, and on examining the under aspect of the right frontal lobe there was a distinct thickening of the covering membranes which concealed the not very large abscess—a thumb-nail would cover it—shown in the figure.

I took out a wedge of skull to include the cribriform plates and neighbourhood of the anterior fossæ and found that the dura mater was thickened, and that this had been the seat of an old injury, and I thought that probably the abscess had originated through infection passing through a damaged cribriform plate of the ethmoid.

The other organs were quite healthy.

Causation.

I wrote to his relatives and asked whether he had ever had an injury to his head and they replied that 24 years previously he had fallen from his horse whilst riding, injured his head, and remained unconscious for two weeks. His recovery had been slow but apparently complete except for the loss of smell and periodical attacks of occipital headache when he over-exerted himself. These attacks were cured by a day in bed and a little aspirin. There can be little doubt that an abscess had formed at the site of a fractured base and that it was the extension of infection from this along the lines of the great vessels that had caused the illness of the four days previous to his death.

But when had the abscess formed? It was adjacent to the old seat of fracture, and it may be assumed that it was a consequence of the fractured base; whether it commenced immediately after the accident, or developed later, it is impossible to say. Judging from the appearance and from the thickening of the dura mater about it, I should say that it was of long standing, and being in the "silent portion" of the brain it gave rise to no symptoms until it was accompanied by meningitis.

The occasional slight attack of indisposition and pain in the head, cured by aspirin and a day in bed, were, may be, small attacks of meningitis, the inflammatory process spreading beyond the confines of the abscess and becoming checked by suitable treatment.

The micro-organism found not only in the pus but also in the abscess wall deserves mention, and I cannot do better than refer to the note which my friend Dr. Chalmers most kindly made for me.

Pathological report.—"The sections of the frontal lobe of the brain contain Gram-positive diplococci in chains, some of them having a Gram-negative element."

For further details see Dr. Chalmers's note at end of this paper.

Remarks.

In the "silent" regions of the brain, when dealing with the subject of cerebral abscess, the well-known text-book of Osler says, "where the abscess becomes encapsulated there may be no symptoms," but it appears to me to be remarkable that this abscess had lain dormant, slowly forming, perhaps, for years, had not even affected consciousness, or intelligence, or character, also that during the last four days of his life, when the local abscess became a general convex meningitis, there should have been only a high temperature and slight occipital headache, followed by apoplectic symptoms for the last 36 hours.

The case deserves recording, I think, as a far-reaching effect and far-off termination of a fractured base. I do not think that there can be the slightest doubt that the fracture through the right cribriform plate of the ethmoid gave entrance to the meningococcus which was neither Gram-staining nor non-Gram-staining. That this meningococcus—not Weichselbaum's—produced an abscess in the under aspect of the right frontal lobe which was chronic and of

long standing, that owing to the climatic conditions of the Sudan the meningococcus suddenly and rapidly spread all over the convex portion of the brain and involved the meninges of the vertex in a purulent meningitis which probably commenced four days before death.

These are the facts. Now for the reflections.

1. It is unwise to prognosticate in cases of fractured base of skull. A fractured base of skull, though apparently recovered from, is still a very serious thing. It would seem that a man may live for 24 years and be none the worse to all appearances and may then die from the direct effects of his fractured base.

From a photograph of the base (under aspect) of the brain showing the site of the abscess (A) and the knife-blade (K).

2. That the whole convex portion of the brain, including inner surfaces and the upper surface of the cerebellum, may be in a condition of progressive purulent meningitis and give rise to no definite signs except a temperature of 104° F. and a little occipital discomfort and later a fixed right pupil, and 24 hours before death unconsciousness and an apoplectic condition terminating in death without meningitis being so much as thought of.

There is found out here in the Sudan and elsewhere a meningococcus both positive and negative in its Gram-staining properties and which is not the meningococcus of Weichselbaum, and which is named by Dr. Chalmers *Streptococcus janus crassus*.

Could anything have been done for such a patient to relieve the abscess? I think not. Its presence was not suspected, there were no localising symptoms, and it was not very accessible to operation if it had been diagnosed. Whatever pain he had was in the occipital region; the abscess was in the inferior frontal portion of the brain. He probably had it for a considerable time previous to his death, perhaps for years, and yet although situated in the frontal lobe on the inferior surface he had "pain at the back of the head when he had worry or extra exertion."

And, finally, a micro-organism such as this meningococcus, when limited to its native habitat—in this case a smallish localised abscess—may remain harmless for years; but passing beyond these limits it may assume an acute and dangerous pathogenic state. In this case, passing from the abscess to the meninges, it assumed a rapidly spreading and fatal character. One may compare it to pathogenic organisms found constantly on the mouth, tonsils, or nasal mucous membranes: quite harmless whilst they remain localised, but by chance becoming transferred to more favourable media—meninges, lungs, other organs—they become virulently pathogenic.

Bacteriological Note by Dr. ALBERT J. CHALMERS.

With reference to the Gram-negative, Gram-positive diplococci found separate and in chains in this case, organisms of a similar nature have now been met with several times in the Anglo-Egyptian Sudan. They were first found by me in two cerebro-spinal contacts in Omdurman in 1913, later in a case of tonsillitis; then in a case of cerebro-spinal meningitis; then in a case of severe tonsillitis which was followed, after an interval of several days, by a scarlet-fever-like eruption associated with desquamation and in a contact of that case; then in several other more or less severe cases of tonsillitis, of which the worst was followed by a scarlet-fever-like eruption associated with desquamation. Finally, I have obtained an organism of this group from the blood of a case of septicæmia.

I am inclined to the belief that the first time any of the organisms were recognised was by Jaeger in 11 cases of cerebro-spinal meningitis in Stuttgart in 1895, and I am also of the opinion that Jaeger's organism is the same as that named *Diplococcus crassus* by von Lingelsheim in 1906, and if so then it is the same organism as that found by myself and Captain O'Farrell, R.A.M.C., in 1916[1] in a case of fulminating cerebro-spinal meningitis in Omdurman, because the two agree in cultural characters and in sugar reactions.

According to the way I look upon the genera of the family *Coccaceæ*, subfamily *Streptococceæ*, these organisms belong neither to the genus *Diplococcus* nor to the genus *Streptococcus*, but to an intermediate genus, for which I suggest the name "*Janus*," owing to the organism being both Gram-negative and Gram-positive and differing in its cultural characters and chemical reactions from *Neisseria intracellularis* (Weichselbaum, 1887), as set forth in the paper indicated above; and *Diplococcus crassus*, von Lingelsheim, 1906, would therefore become *Janus crassus* (von Lingelsheim, 1906), and should be considered as identical with the organism which has been found in a case of cerebro-spinal meningitis and in contacts therewith and in carriers in the Anglo-Egyptian Sudan.

The cultures kindly sent me from the above case were unfortunately contaminated, being obtained by post-mortem examination. These contaminative organisms killed the other growths before I could separate them, but both they and the brain showed the presence of a Gram-negative, Gram-positive diplococcus arranged in chains, and I am of the opinion that in all probability the organism in this case was *Janus crassus* (von Lingelsheim, 1906), though of course definite proof is lacking.

UNUSUAL RENAL CALCULI WITH SEVERE HÆMORRHAGE AS THE ONLY IMPORTANT SYMPTOM.

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SURGEON TO THE SAMARITAN FREE HOSPITAL.

THE very slight degree of pain and the close resemblance of the 18 small faceted stones to gall-stones seem sufficiently unusual to make a note of this case interesting.

A woman, aged 41, the mother of three children, the youngest born on April 7th, 1917, was healthy until her last confinement. Recovery from this was not good, but Dr. G. H. Mitchell informs me that feebleness was the only symptom, and that nothing abnormal was observed in the urine at that time. Six weeks after the child's birth it was noticed that the mother's urine was of a bright red colour, which continued with increasing weakness until, early in July, the patient fainted. She had no pain and said she had not suffered in any way except from weakness, but later she allowed that for about seven years there had been an occasional stitch and dragging in her side, on account of which she wore a very strong corset. She insisted that the pain was nothing to complain of.

On admission to the Samaritan Free Hospital on July 11th her lips were almost as white as the rest of her face. The urine contained much blood thoroughly mixed with it. The inner side of the right kidney was easily felt and very hard, but it was not tender. An X ray examination showed

[1] Vide Journal of Tropical Medicine and Hygiene, May 1st and 15th.

a large shadow in the right kidney region and a small one near the bladder in the line of the right ureter.

Calculi were diagnosed, but the combination of so much hæmorrhage with so little pain suggested that possibly there was some further disease. I therefore opened the abdomen on July 20th to examine both kidneys, as removal of one might be thought advisable. The left seemed a little firmer than usual, but was otherwise normal. In the lower end of the right kidney many stones were felt moving on each other like gravel. The ureteric calculus was also identified close to the broad ligament.

The right kidney was brought out on the loin through a second incision with considerable difficulty on account of old adhesions to the peritoneum, and the latter was torn in the process of separation. This kidney contained the large stone shown in the figure (A). Its various rough projections

A, Large renal calculus; B, 3 of 18 small renal calculi; C, ureteric calculus. (Natural size.)

occupied different calyces. The large, smooth, rounded portion, part of which is faceted, and 18 small faceted stones lay in a dilated calyx at the lower end of the kidney. An average three of these small stones are shown (B). Many of them have one rounded surface which evidently was in contact with kidney substance. There were few, if any, more than a single layer of these stones, all, or nearly all, being in contact with the large one. The renal calculi were removed through an incision into the lowest calyx slightly extended to release the branches of the big stone, one of which, not shown in the figure, was broken but came out entire. The bulk of the renal tissue was healthy and no other disease was found. A single suture closed the more fleshy divided part of the kidney, the thinned wall of the lower calyx being left unsecured. The loin wound, except where an opening for drainage was left, and the tear in the peritoneum were carefully closed.

Through a third incision in the right groin the peritoneum was separated down to the ureter, a snick in which released the small rough stone shown in the figure (C). One catgut suture closed the opening. The left hand in the peritoneal cavity was of the greatest assistance in locating and bringing into view the ureter and stone. The groin wound was closed except for the presence of a drainage-tube, which was removed on the third day. The anterior incision was closed and union by first intention took place in all the wounds except at the points of drainage.

There was very little discharge from the kidney, and no urine was detected in this discharge at any time by sight or smell. The drain was gradually removed. Hæmaturia ceased after four days, but some albuminuria continued. The patient was sent to the Samaritan Free Hospital Convalescent Home on August 11th, still very weak but making blood fast. There was then only a small superficial wound unhealed in the loin.

Wimpole-street, W.

Reviews and Notices of Books.

Tumours, Innocent and Malignant; their Clinical Characters and Appropriate Treatment. By Sir JOHN BLAND-SUTTON, LL.D., F.R.C.S Eng., Surgeon to, and Chairman of the Cancer Investigation Committee of, the Middlesex Hospital, &c. Sixth edition. With 383 illustrations. London: Cassell and Co., Limited. 1917. Pp. 790. Price 21*s.* net.

ON its first appearance in 1893 Sir John Bland-Sutton's book on tumours at once established its reputation as an authoritative and suggestive work on a subject of widespread interest, and it has long achieved the position of an English medical classic. From the preface to this, the sixth, edition we learn that so long ago as 1885 Sir John Bland-Sutton began to collect material for his study of tumours, and it is well known that he has retained his interest in the subject. The successive editions of his book show how much enthusiasm and original thought he has devoted to it. One of the features which have rendered this book so interesting is the manner in which it is illustrated by references to tumour growth in animals. Sir John Bland-Sutton points out the value of comparative pathology in elucidating some of the obscure problems in connexion with tumours, and his own profound knowledge of this subject has been in many instances applied suggestively with good results. He admits at the outset that no one has succeeded in framing a satisfactory classification of tumours, and he adopts a histological classification as most convenient for purposes of description—viz., tumour diseases of the connective tissues, tumour diseases of teeth, epithelial tumours, endotheliomas, tumours arising from the fœtal membranes, teratomas, and cysts. This classification at least has the merits of simplicity and convenience and involves no theoretical assumptions. Each group is then considered separately, and one or more chapters is devoted to a consideration of each variety in the group. Among the connective-tissue group we need only mention the description of uterine fibroids, which, as might be expected, is a most interesting and instructive one, profusely illustrated by woodcuts of important specimens almost entirely from the author's own experience. Referring to the difficulties of accurate diagnosis in these cases, Sir John Bland-Sutton has framed some aphorisms on pp. 228–229, in the manner of Agur the Sceptic, which embody in convenient form some useful cautions.

To appraise a work on tumours one would naturally turn to the description of cancer, and judged by this criterion Sir John Bland-Sutton does not fall short. His chapter on the cause of cancer gives within short compass a summary of the two chief theories, the embryonic and the parasitic, points out the great difficulties of the whole problem, and counsels patience and persistence in dealing with it. The epithelial tumours are then dealt with according to their regional incidence, the clinical characters and treatment of each form being succinctly and critically presented. Among the other sections which are worthy of special mention we may refer to those on teratomas and dermoids, which are both dealt with in an instructive and clear manner. Sir John Bland-Sutton writes well, and is always happy in his allusions and illustrative similes. We have read this new edition of his book with great interest, and can commend it to our readers.

JOURNALS.

The Journal of Physiology. Edited by J. N. LANGLEY, Sc.D., F.R.S. Vol. LI., No. 3. Cambridge University Press. 1917. Pp. 111–210. Price 6*s.* 6*d.*—The Metabolism of Arginine, by W. H. Thompson. This is the third communication by the author on this subject and deals with arginine and creatine formation. Dogs, birds, and rabbits were used. Arginine carbonate given with food to dogs and ducks increased the output of total creatine in the urine. On the excretion of preformed creatinine the addition of arginine to the food in dogs and birds produced no effect. Intravenous injection of arginine increased the creatine of rabbit's muscle, which corresponded on the average to a storage of 14·5 per cent. of the guanidine. From the experiments on rabbits it would seem that after arginine is injected into the circulation a portion of its guanidine nucleus is converted into creatine, some of which is stored, for a time at

least, in the muscles, and part excreted in the urine.—The Action of Guanidine on the Neuro-myal System of Decapod Crustacea, by J. Smith Sharpe. Guanidine in the vertebrate acts first as a stimulant and then as a depressant upon the motor cells of the spinal cord, and it also acts upon the neuro-myal junction in the skeletal muscles in the frog and mammal. Although crustacean and vertebrate muscles are structurally very similar, creatine is absent from crustacean muscle. It would seem that in degenerate muscle after nerve section there is a marked fall in the creatine present. Another difference in the neuro-myon is that curare does not act on the neuro-myon in crustacea. The author finds that in crustacea guanidine salts produced jerkings and tremors of the muscles similar to those produced in vertebrates. This is due to an action on the central nervous system as in mammals, and not to an action on the peripheral neuro-myon as in the frog. On these peripheral structures guanidine appears to be without action.—On the Capacity of Blood and Hæmoglobin to Unite with Carbon Dioxide, by George A. Buckmaster. Blood, as is well known, can absorb quantities of carbon dioxide. Within limits the amount of gas absorbed would appear to rise and fall with the quantities of hæmoglobin present, and therefore the quantity of the pigment is a determining factor in this matter. Salt-free blood can absorb quantities of CO_2, and within limits the capacity to do this augments with the percentage of hæmoglobin. The author has not found much evidence to indicate that proteins free from salts can absorb this gas to any marked extent. Experiments showed that hæmoglobin is capable of taking up considerable amounts of CO_2 at pressures between 760 mm. and 70 mm., pressures which do not normally occur in the human body. So far the author has found that none of the proteins of the blood possess the property of absorbing carbon dioxide to the degree possessed by hæmoglobin. This pigment may behave generally like other proteins, but in addition possess a specific capacity for the absorption of carbon dioxide.—A Comparison between Voluntary and Electrically Induced Muscular Work in Man, by A. Krogh and J. Lindhard. In 1911 Professor J. Bergonié, of Bordeaux, constructed an instrument by which powerful rhythmic contractions of human muscles can be induced electrically with a minimum of unpleasant sensations. The authors used a modification of this apparatus, combining it with the recording respiration apparatus of Krogh. Only the muscles of the legs were stimulated to avoid direct stimulation of the respiratory muscles. The arm was used for pulse-rate. The authors formulate the following conclusions:—

1. The Bergonié treatment consists in rhythmic tetanisation of human muscles. When applied to all the muscles of the legs it can without causing painful sensations raise the gas exchange to 1600 c.c. O_2 absorbed per minute. 2. The effects on circulation and respiration of work induced by the Bergonié process have been studied and compared with those of voluntary work on the ergometer. (*a*) The mechanism of the initial increase in pulse and ventilation rate is different in the two kinds of work. The increase originates, as a rule, from cerebral impulses in voluntary work, but is produced reflexly in induced. A chemical regulation sets in later in both cases. (*b*) During work—induced and voluntary alike—the pulse-rate and circulation rate are linear functions of the metabolism, but different in different subjects and dependent upon the state of training. (*c*) The rate of ventilation is usually greater in induced work than in voluntary, corresponding to the same oxygen absorption. This is probably due to afferent impulses from the stimulating currents. 3. The direct effects of the Bergonié treatment as a cure for obesity are insignificant, but the indirect effects produced by training of the muscles acted upon are probably considerable, though we have not succeeded in demonstrating them in our experiments.

The Oxygen Use of Denervated Muscle, by J. N. Langley and M. Itagaki. Denervated muscle rapidly loses weight so that the balance of repair and breakdown is upset, to the detriment of the former. Is the disturbance of balance due to a lessened power of repair or increased breakdown, or both of these? A lessened power of repair has already been shown to be in part responsible for the change. The animals used were cats and the nerves were cut on the left side. Samples of blood were collected and analysed, the controls being taken from the undenervated side. The authors made eight determinations on the oxygen use of denervated muscles on one side of the body and of the undenervated muscles on the opposite side. In all cases a much greater oxygen use per gramme per minute was found to be present in the denervated muscles. It is concluded from this that the atrophy of denervated muscles is not solely due to a decreased power of repair, the breakdown remaining constant, but that it must be due chiefly to an increase in the rate of breakdown of the muscle substance.

Quarterly Journal of Experimental Physiology. Edited by E. A. SCHÄFER, W. D. HALLIBURTON, C. S. SHERRINGTON, E. H. STARLING, and A. D. WALLER. Vol. X., Nos. 3 and 4, London: Charles Griffin and Co., Limited. 1917. Pp. 203–401. Price 15*s.*—Almost the whole of the text is taken up with an elaborate note on the Parathyroids—Tetania Parathyreopriva: its Nature, Cause, and Relations to Idiopathic Tetany. It is divided into eight parts. Part I., by D. Noël Paton and Leonard Findlay, after an introduction on idiopathic tetany and experimental tetany, deals with general methods and symptoms. Part II., by D. Noël Paton, Leonard Findlay, and Alexander Watson, deals with the Parts of the Central Nervous System Involved, and treats successively of the cerebral and cerebellar arcs and the spinal arc and its efferent spinal neurons. The authors find from their experiments on cats and dogs that—

1. The nervous symptoms are due to the condition of the central nervous system. 2. In the production of the spasticity, tremors, and jerkings the cerebral arc is not directly involved. The increased violence of these symptoms after decerebration is due to unopposed action of cerebellar and spinal arcs. 3. The tremors and jerkings develop independently of the cerebellar arc, but the integrity of this arc is essential for the production of the sustained spastic tone. 4. The integrity of the spinal arc is not essential for the development of the tremors and jerkings, since they persist after section of the dorsal roots of the spinal nerves. The efferent neurons are the structures primarily implicated. 5. In advanced cases of tetania parathyreopriva disturbances of equilibrium seem to indicate a secondary involvement of the cerebellum. 6. In such advanced cases the onset of epileptiform convulsions probably indicates the secondary involvement of the motor part of the cortex cerebri.

Part III. is by the same authors and deals with the Changes in the Peripheral Nerves and in the Muscles. This contribution runs to over 70 pages. The methods used and the results obtained in testing the electrical excitability of nerve and muscle are fully described. In the normal animal the method of determining the electrical excitability (E.E.) of nerve and muscle by the application of the electrode on the skin over the structure to be stimulated gives a fairly accurate and consistent method of estimating the E.E. in milliampères. As to tetania parathyreopriva and idiopathic tetany the following are some of the authors' conclusions:—

1. As shown by previous workers, any marked decrease in the amount of parathyroid tissue is followed by a very marked increase in the E.E. of the peripheral motor nerves. The same is found in all cases of idiopathic tetany. 2. As a rule, no alteration of the normal sequence of the various responses results, but the A.O.C. is more frequently than in health greater than A.C.C., and on occasions may equal or be greater than K.C.C. This is, however, of no diagnostic value. 3. Mechanical excitability, so characteristic of idiopathic tetany, is not in our experience such a prominent feature of tetania parathyreopriva. 4. The increased E.E. of the peripheral nerve is independent of changes in the central nervous system. It occurs after section of the nerve and persists till degeneration sets in, whether the nerve be cut before, with, or after the removal of the parathyroids. 5. The E.E. of muscle to direct stimulation is increased after parathyroidectomy, although not generally to the same extent as that of the nerve. 6. This is chiefly due to an increased E.E. of the neural structures in the muscle. In some cases there is evidence that a post-neural substance may have its excitability increased. 7. The nerve-ending is the part of the neural element acted upon, since in cross-circulation experiments the results of stimulation of the sciatic nerve bathed in the animal's own blood varies with the changes produced in the peripheral nerve supplied with the foreign blood. 8. In tetania parathyreopriva the increased E.E. of the peripheral motor neuron is not proportionate to the intensity of the symptoms due to the condition of the central nervous system, and after a definite fit it may be markedly reduced. In idiopathic tetany the relation is somewhat closer, but is not directly proportionate. Hence the increased electrical excitability cannot be taken as a measure of the severity of the condition.

Part IV., the Etiology of the Condition and its Relationship to Guanidine and Methyl-guanidine Intoxication, is by D. Noël Paton and Leonard Findlay. The various possibilities as to the way in which removal of the parathyroids induces the characteristic train of symptoms are first considered. A comparison of the symptoms of guanidine poisoning with

those of tetania parathyreopriva shows a very close correspondence. They bear the same relationship to tetania parathyreopriva that those following the administration of diphtheria toxin bear to the symptoms of true diphtheria. The conclusions arrived at are as follows:—

1. There is no direct interrelationship between the parathyroids and the thyroids. 2. There is no evidence that the parathyroids exercise a direct controlling influence on the central nervous system. 3. The symptoms of tetania parathyreopriva are not primarily due to decrease in any constituent of the body—e.g., calcium ions. 4. The symptoms are not due to an increase in ammonia or xanthin or β-iminazolylethylamine in the blood. 5. The symptoms are identical with those produced by the administration of salts of guanidine and methyl-guanidine. Direct evidence of the increase of these substances in the blood is given in the next paper.

Part V., Guanidine and Methyl-Guanidine in the Blood and Urine in Tetania Parathyreopriva and in the Urine of Idiopathic Tetany, by David Burns and J. S. Sharpe. Up to the present no estimations of the amount of guanidine or of methyl-guanidine in blood of normal animals have been recorded. Small quantities of both are known to occur in human urine. The amount of these bases in the urine is greatly increased in animals killed by anaphylactic shock or by burning. The methods used are fully recorded. The authors' results are summarised in the following table:—

Guanidine (and the Methyl-guanidine expressed as Guanidine) in mg. per 1000 c.c.

A. BLOOD.	*Dogs.*	
Normal (average of 5) 1·0.		Parathyroidectomy (average of 8) 8·7.
B. URINE.	*Dogs.*	
0·25 (average of 6).		1·1 (average of 6).
	Children.	
(Average of 5 individuals) 8 analyses, 0.12.		Idiopathic tetany (average of 3 cases), 13 analyses. Active tetany ... ... 0·58. Latent tetany ... ... 0·38. Recovery from tetany 0·12.

There is a marked increase in the amount of guanidine and methyl-guanidine in the blood and urine of dogs after removal of the parathyroids and in the urine of children suffering from idiopathic tetany. Part VI., The Action of the Blood Serum of Animals in Tetania Parathyreopriva on the Skeletal Muscles of the Frog, by George M. Wishart. In certain cases the serum of parathyroidectomised dogs and cats acts upon the muscles of the frog in the same way as do dilute solutions of guanidine or methyl-guanidine. But the variations in the susceptibility of the muscles of different frogs render this biological test unreliable. Part VII.: A Comparison of the Influence on the Protein Metabolism of Parathyroidectomy and of the Administration of Guanidine, by David Burns. From his experiments the author concludes that the close similarity in the metabolic disturbances induced in the dog by removal of the parathyroid glands and by the administration of a salt of guanidine to a fasting animal supports the evidence already adduced in the previous parts that these two states are identical. Part VIII.: The Functions of the Parathyroids and the Relationship of Tetania Parathyreopriva to Idiopathic Tetany, by D. Noël Paton and Leonard Findlay. Reviewing the previous work and their own, the authors conclude that the parathyroids regulate the metabolism of guanidine in the body. By doing so they probably exercise a controlling influence on the tone of the muscles. Tetania parathyreopriva and idiopathic tetany are identical as regards their characters and metabolism, and, although the histological evidence is not conclusive, in all probability the parathyroids are implicated in the latter as in the former.

The Veterinary Review. Vol. I., No. 3. August, 1917. London and Edinburgh: Green and Son. Price 3*s.* 6*d.* quarterly.—In the *Veterinary Review* for August the editor, Dr. O. Charnock Bradley, has again put before the scientific reader a complete digest of all matters which concern the welfare of the animal world as regards its relation to medicine and surgery. It contains summaries of articles written in all civilised countries by numerous authors both medical and veterinary, and an original article on "The Transmission of Animal Trypanosomiasis in Northern Rhodesia by Blood-sucking Flies other than *Glossina*," by Captain Frederick Chambers, F.R.C.V.S., A.V.C. To the busy scientific man, whether engaged in laboratory or purely clinical work, a digest of this kind is of the greatest value, enabling him to keep in touch with all advances.

New Inventions.

DEVICES FOR MOVING PATIENTS.

A DESCRIPTION is given below of two little inventions I have adopted for the use of military patients here, with gratifying results.

1. *Carrying device.*—The canvas (Fig. 1) is passed under the patient and two nurses, orderlies, or porters on each side take hold of two handles each. At the word "Lift" the patient

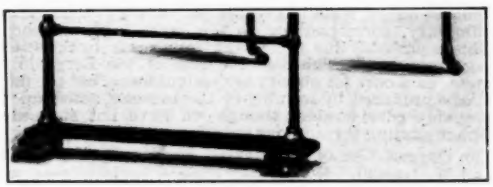
FIG. 1.

The carrying device.

is lifted bodily on to the wheeled stretcher, taken to the theatre, and lifted on to the table. After the operation he is carried back in a similar way. The canvas is removed before he comes out of his anæsthesia and it is put under the next case for operation. In this hospital, where we have over 500 wounded, I find a stretcher for each ward is enough. The village saddler makes them for 6*s.* 6*d.* When not in use they are hung by one handle across the anæsthetic room. It is possible to move a patient, however badly wounded, from the bed to the operating table and back again without any handling of his person, hence saving pain, &c.

2. *The trolley.*—The ends of the beds have no castors. The bed end is raised, the trolley put in position under the end of the bed, and the two feet of the bed drop into the cavities in the trolley, as shown in Fig. 2. When the bed

FIG. 2.



The trolley in position.

reaches the desired position the end is raised, the trolley kicked out of position, and used for the next case. The trolley can be wheeled anywhere provided the wheels do not sink into the soil with the weight of the bed. The cost, wheels included, is 3*s.* 9*d.* With few exceptions we wheel every bed into the balconies or grounds for all bedridden cases early in the morning, and at sundown they are wheeled back. The time occupied for this is on the average 40 minutes. One trolley is supplied to each ward of 30 beds.

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LONDON: SATURDAY, SEPTEMBER 22, 1917.

Losses and Compensations.

SOMETHING used to be heard of the ease and safety of the doctor's duties in the field, whether by land or sea, compared with those of his fellow officers in one of the combatant services. Such expressions grew rare during the South African War, and now are heard no more. The appearance with a terrible regularity of obituary notices of doctors, many of them at the commencement of promising careers, who have been instantly killed as they tended the wounded in advanced posts, who have been drowned in naval engagements or in torpedoed hospital ships, or who have died of injuries and diseases incidental to campaigning, has opened the eyes of everyone to the risks run by the medical officer on active naval or military service. In administrative posts, again, the medical work is often excessively onerous, for on the constant watchfulness and care of the responsible officer, and on the maintenance of a high standard of efficiency, depend the lives and the chances of restoration of countless numbers of men of all ranks. It is only right that for such services honours should be given, and in the record of the London medical schools for the third completed year of warfare is contained the evidence that the debt of the country in this way is being steadily paid. More than 150 holders of the Military Cross appear in this incomplete list of London schools alone, along with other still more coveted distinctions, while the total of Commanderships of many noble Orders is not much fewer. The figures from Scotland, Ireland, and the provinces tell a like tale of duty done and guerdon won.

This is one side of a picture on which it is justifiable for the profession of medicine to look with pride. But there is another side, and the attention of medical men requires no directing to it; it is always present, consciously or subconsciously, to the mind of the doctor on service. What is becoming of his practice? What will remain of it when he returns? What will become of him if disabled, and of those dependent on him if he is killed? And the anxiety has not been rendered less by the extreme uncertainty which has prevailed until recently in regard to what the State is prepared to do in compensation for the losses entailed in its service, and how other needs are to be met for which the State disclaims responsibility. The draft of the new Royal Warrant issued a week or two ago by the Ministry of Pensions now makes it clear enough what the officer can expect from the State on account of personal disablement; and, in case he loses his life, for the maintenance of his widow and the education of his children. To many whose personal needs have been small and their establishments simple the State aid, which comes to them as their right and in recognition of services rendered, should not prove inadequate. But in many other cases this will not be so, and the man whose only asset before the war consisted of a good education and a hopeful prospect may well have grave doubts for the future of his wife and young children if he is taken from them or left disabled. Yet provision for them is indeed his right. It is not a question of charity but of justice, and it is to this category that many of the Army medical officers belong. The lack is pressingly felt of a patriotic fund including the whole medical profession to make automatic provision for all cases of hardship. Financial success in medicine is a lottery in which prizes are not won by all the deserving, but a percentage levy on the actual income of each medical man, whatever his position, would suffice to insure all its members against the risks of death and disablement before success is theirs. The Royal Medical Benevolent Fund in times of peace has long attempted to meet this need on a voluntary basis, although its means have never been sufficient to do so completely. It is appropriate for the same organisation to deal with war emergencies, keeping the money to be raised for this purpose strictly separate from the main Fund. We have already given publicity to this special War Emergency Fund, directing attention to the desire of its promoters that it shall supplement and fill in the gaps left by other agencies without competing with them or covering any of the same ground.

Death and disablement with the consequent need of support for the widow and educational facilities for the orphans are more tangible objects for relief than the loss of professional earnings from a practice which has inevitably dwindled during absence on service. Where the drop has been greatest it can still, doubtless, be made good within some period after the practitioner's return in full vigour of mind and body, but in the meantime he will have many out-goings and little or no in-comings, and in some cases will be involved in a heavy uphill struggle. No fund quite meets his case. The Loan Fund proposed by the British Medical Association was intended for this purpose, but a wise decision of the recent Annual Representative Meeting deferred its definite institution until it has been shown that the needs cannot be met by the amalgamation or coöperation of other funds. In another column we have set out with some detail the nature and scope of these other funds, beginning with the Civil Liabilities Committee, which deals with non-commissioned applicants, leading on to the Professional Classes War Relief Council, whose work has been of surpassing value to many of those whose burdens have been borne in silence. The work of the Officers' Families Fund has in the aggregate been very large, but its field of action is also very large, and it naturally deals only in small proportion with the needs of the medical services. The Officers' Benevolent Branch of the Auxiliary

R.A.M.C. Funds has not yet existed long enough to command the support essential to its complete success. The War Emergency Fund of the Royal Medical Benevolent Fund proposes to take cognisance of the work of all these agencies, and to test their application in each several case by personal inquiry on the part of a single member of its staff. The inquiry officer, who will be pledged to secrecy, will then lay an anonymous case before the executive committee of the Fund. An immediate and adequate response to the appeal for the successful carrying out of the scheme will certainly go far to lighten the burden of many a medical man now on service, and will do so in a way removed as far as possible from an act of charity. We commend the War Emergency Fund of the Royal Medical Benevolent Fund again to the consideration of the medical profession and to the generosity of the general public.

Current Epidemics in the Central Empires.

MEDICAL science during the present war has succeeded in preventing the occurrence among the military of certain epidemic diseases which in former campaigns have ravaged the forces in the field. But among the civil populations of the Central Empires and among the unfortunate inhabitants of the occupied territories it is otherwise. At the present time small-pox, typhus, and dysentery are very prevalent, and relapsing fever is threatening to add itself to the list. For more than two years small-pox has been epidemic in Austria, and more particularly in the provinces of Galicia and Bukowina. Not far short of 50,000 small-pox cases have been reported in Austria during 1915–16, more than 42,000 of the attacks occurring in these two provinces, whence the infection was carried to some of the larger cities, including Vienna, Prague, and Budapest. In Vienna during the 12 months immediately following the outbreak of war over 1600 cases were reported. As vaccination is not obligatory in the civil population of Austria many persons are unprotected against small-pox infection. In Poland the disease is visiting Warsaw, among other places.

Germany is regarded as being the best prepared of all European countries to resist attack by small-pox; but the disease has been epidemic in North Germany during the first seven months of 1917, 2400 cases having been notified to the authorities, the largest number yet recorded in Germany since notification was begun. The prevalence began in December, 1916, at Hamburg, where Russian prisoners were being employed as dock labourers and by whom probably the infection was introduced. In addition to the prisoners of war large numbers of the people of the occupied districts of Belgium, Northern France, Poland, and other Russian provinces have been deported from their homes and compelled to work in North Germany in the fields or in the mines and factories or in other industries. These wretched slaves, coming from countries in which vaccination is not compulsory, are in many instances unprotected against small-pox, and form susceptible material on which an epidemic could easily develop. Their susceptibility to infection is not likely to have been diminished by the overcrowding, underfeeding, and the overworking to which they have been subjected, nor by the depression of spirits from which they have suffered during their bondage. From Hamburg small-pox spread in the early months of 1917 to other districts in North Germany, affecting also some of the large towns, including Berlin, Munich, Leipzig, Potsdam, Essen, Bremen, Altona, Kiel, and Lübeck. Small-pox is in Europe generally a disease of the winter and spring months, so that while there has been in August some diminution in the number of cases reported weekly, it is very probable that with the advent of winter we may see a recrudescence of the epidemic in Germany.

Typhus is endemic in the Austrian province of Galicia, but since the outbreak of war it is probable that typhus infection has been brought into the Austrian war zones by prisoners from Russia and Serbia. It is well known that the wretched Serbian prisoners interned in Austria since the war have died in thousands from typhus in the concentration camps. Among the Austrian civilian population more than 13,000 typhus cases occurred during 1915, and over 12,000 in 1916. During the first three months of 1917 about 3000 fresh cases were notified, most of them in Galicia. In Hungary, typhus is now prevalent, and in the first half of 1917 some 2500 cases were reported. In Bosnia and Herzegowina typhus has also been rife during the whole period of the war. In Poland, now occupied by German troops, there is at the present time a very severe epidemic of typhus going on, especially in the city of Warsaw and in the adjoining districts. During the last 12 months nearly 16,000 cases have been reported, of which more than 8500 occurred in Warsaw. Typhus has been appearing in Germany since 1914, chiefly among the prisoners of war who, crowded together in large numbers in camps, with little means afforded them of maintaining personal cleanliness or opportunities for changing their clothes and keeping themselves free from body vermin, soon developed typhus of a virulent kind, probably infected in the first instance by Russians.

Dysentery is epidemic in Germany, and especially in Prussia, where in the first seven months of 1917 about 13,000 cases were notified among the civil population, more than 6000 attacks being reported during the last fortnight. The chief places at present affected are Berlin, Potsdam, Strasburg, Frankfort, Munich, Mannheim, and the industrial districts of Rhenish Westphalia. In Austria, too, dysentery is epidemic and from February to July, 1917, more than 4000 cases were officially recorded. A Vienna newspaper recently stated that "cholera itself could not be worse than the dysentery epidemic now raging." This paper also asserted that the disease had been brought to Vienna by soldiers from the front. There is suggestion that these prevalences of dysentery in Germany and Austria are associated with malnutrition, arising partly from improper or

insufficient diet and the use of the so-called "food substitutes." There is a great scarcity of milk and dysenteric patients are often unable to obtain this essential article of their diet. When obtainable the fatty matter has already been abstracted from the milk by order of the Government for use in munitions works. There appears to be a possibility that before long relapsing, or famine, fever will be added to the epidemic diseases current in the Central Empires. Already cases are being reported weekly in some districts of Germany, and Mannheim is specially mentioned as one of the worst sufferers. In Poland relapsing fever is also occurring, and cases in increasing numbers are being reported week by week, especially in the towns of Warsaw, Lodz, and Plock, where the Poles are experiencing great privations and where the various epidemics have been adversely affected by the absence of medical men.

Annotations.

"Ne quid nimis."

THE ESTIMATION OF FILTRATE-NITROGEN IN BLOOD AND OTHER BODY-FLUIDS.

Mr. R. Donald, B.Sc., is publishing in the *Quarterly Journal of Medicine* the results of a careful investigation into the methods for estimating filtrate nitrogen in the blood and other body-fluids. The research was made at the Pathological Institute and the Clinical Laboratory, London Hospital. It is obvious that an estimate of nitrogenous waste in the blood might prove a valuable aid to diagnosis and therefore to treatment. The work was done in the course of an inquiry into the retained nitrogen in various substances, principally blood and cerebro-spinal fluid obtained in the wards and post-mortem room of the hospital. The method consists in precipitating the proteins, centrifuging instead of filtering, and then testing the clear fluid by an efficient hypobromite process. The proteins are eliminated in two simple rapid stages. First, the blood in a centrifuge tube is mixed with its own volume of a saturated sodium chloride solution in 6 per cent. sulphuric acid or in a mixture of nine-tenths of 6 per cent. sulphuric acid and one-tenth of 6 per cent. phosphoric acid. The use of brine containing phosphoric acid avoids the precipitation of ammonia by phosphomolybdic acid, while it is compatible with phosphotungsic acid. After two centrifugations a clear liquid is obtained ready for treatment in the ureometer. Ammonia and creatinin are included in the filtrate-nitrogen; ammonia being the direct representative of urea the inclusion of its nitrogen is desirable. By this method it is stated that a provisional reading can be reported within about 20 minutes of the time the blood was received, but for accuracy another half-hour is required. The particular method of employing the ureometer for the purpose is fully described in the paper. It depends upon the decomposition of the urea, creatinin and ammonia by hypobromite into free nitrogen gas. Control experiments done with various small known amounts of urea and of ammonium chloride showed that the process is quite close enough for clinical purposes. According to the author, the normal lowness of the filtrate-nitrogen in the blood seems to depend on three factors: (1) A sufficiency of healthy kidney tissue; (2) a sufficiently maintained or compensated circulation of blood through the kidneys; (3) a sufficient supply of water to the blood to allow a normal excretion of urine through free passages. In children factors (1) and (2) are usually so good that their health percentage of filtrate-nitrogen seems smaller than the 0·035 per cent. of filtrate-nitrogen stated as the general health limit. Finding, he adds, in the blood taken at the autopsy of a baby admitted dying of diarrhœa and vomiting, but not yet emaciated, some 0·18 per cent. of filtrate-nitrogen "is like hearing a post-mortem echo of the cry of the child's system for water." Finally, such subimbibitional hypernitræmia will, he concludes, be allowed for by an observant medical attendant. As for factor (2), the "heart kidney" seems to maintain the excretory function wonderfully well, but when factors (1) and (2) coöperate in failure, as, for instance, when with insufficient kidney tissue the circulation fails, then the filtrate-nitrogen may rise to 0·2 per cent. and higher, much as in acute nephritis with increased blood pressure. The test described may prove valuable, adding to the objective data for the clinician's skill to work on. The details of manipulation and the requisite apparatus are clearly described.

INCIPIENT SCURVY.

PROBABLY the most common error of diagnosis is failure to recognise a disease in its earlier stages. To some extent this is unavoidable; a certain degree of development of symptoms is necessary for diagnosis. But errors are constantly occurring from want of knowledge of the early stages of disease. With very few exceptions (such as pulmonary tuberculosis) these have not been systematically studied. The text-books describe almost solely the well-developed clinical picture, and if here and there an early symptom be mentioned no attempt is made to sketch the disease as a whole at an early stage, and in the section on diagnosis only the fully developed disease is considered. In the *Cleveland Medical Journal* for August Dr. J. M. Miller has suggested how infantile scurvy may be recognised at a stage previous to the development of the well-known symptoms. His attention was first drawn to the existence of this stage by the following case. A child, aged 18 months, had been ailing for several weeks with fretfulness, loss of appetite and sleep, failure to gain weight, and slight irregular fever. These symptoms were attributed to teething, but no teeth were erupting. No digestive disturbances were apparent, nor could evidence of tenderness on moving be discovered, unless fretfulness on being disturbed could be so explained. The knee-jerks were exaggerated. Careful examination of the gums showed them to be perhaps a little dusky, but there was no bleeding or sponginess and no petechiæ. The infant was taking a high-grade commercially pasteurised milk with a proprietary preparation of dextro-maltose. This preparation was stopped and orange juice and potato given. In a week the child was well, thus indicating the scorbutic nature of the complaint. In another case a child of 12 months had but one symptom, crying as if in pain when rolled over on the left side, but firm pressure over the upper part of the left thigh seemed also to give pain. Careful search failed to show anything else. The infant was exceptionally robust. It was found on inquiry that the mother was pasteurising the already commercially pasteurised milk. Fresh milk and orange juice were given,

and the symptoms disappeared in a few days. In a third case an infant, aged 9 months, had been fed on a milk prepared with peptogenic milk powder, upon which it had thriven. From the beginning of the eighth month it had ceased to gain weight, becoming fretful, with loss of appetite and sleep. These symptoms were attributed to teething, although no teeth were present. The only suggestive sign was some œdema of the lower limbs and perhaps slight pain on deep pressure over the spines of the tibiæ. Orange juice and fresh milk were given and the powder discarded. In a week all symptoms had disappeared. In a fourth case a child of 10 months was fed on a proprietary dextro-maltose preparation and pasteurised milk, on which it did well up to 8½ months. From this time it ceased to gain weight, or gained only slightly. Anorexia then ensued, only half the amount of food being taken. For two or three weeks there had been slight fever (100·5° F. at night), with fretfulness and sleeplessness. As usual, the symptoms were attributed to teething, and two upper incisors were erupting. Careful examination revealed only slight exaggeration of the knee-jerks. On stopping the malt food and giving fresh milk and orange juice the infant's condition quickly became normal. Not one of these infants showed the classical picture of scurvy. Indeed, two of them would have been impossible to class as such but for the therapeutic test. This form of scurvy has been described also by an American writer, Alfred F. Hess, as "latent scurvy," characterised by stationary weight, pallor, anorexia, and general want of well-being, quickly disappearing under antiscorbutic treatment. No doubt, as Dr. Miller remarks, it is not uncommon, although not generally recognised. It then either ends in spontaneous recovery or progresses to a well-defined form. Hess has shown that it can be produced by pasteurisation of milk. Bi-pasteurisation seems to have been a factor in some of the above cases. Dr. Miller appears to have given a satisfactory explanation of some of the cases labelled "dentition" for want of a better diagnosis.

CAMPHOR IN CARDIO-VASCULAR DISEASES.

THERAPEUTIC observations by Professor Marfori,[1] of the University of Naples, with regard to the action of camphor on the cardio-vascular system, have brought to light certain properties which deserve attention. Hitherto this drug has been looked upon as the last resource to prolong the life of a diseased and exhausted heart, and injections of camphorated oil have been almost exclusively reserved for counteracting cardiac collapse in acute infective disorders or the threatened paralysis of the last stages of heart disease. Professor Marfori and his assistant, Dr. G. Leone, found that the isolated mammalian heart, when poisoned by chloral so as to render the pulsations barely perceptible, could be rapidly restored to action by camphor, and furthermore, that its action on the circulation was very characteristic, as it could be proved that small doses invariably caused a diminution of arterial pressure and at the same time increased the volume of the cardiac pulsations. Only toxic doses of camphor give rise to increased arterial pressure, accompanied by convulsive phenomena which seem to be independent of the vaso-motor centres, as they are observed even during profound narcosis when these centres are rendered inexcitable. Hence during the course of chronic myocarditis with simple cardiac insufficiency, changes in rhythm and auricular fibrillation, Professor Marfori considers no other drug can compete with camphor in sustaining the activity of the heart and steadying the pulse. He noticed that the beneficial effects obtained were continued after the drug was suspended, but recommends systematic treatment for a long period by giving one, or two, daily hypodermic injections of 0·10 gramme in oily solution. These doses may also be given by mouth as they are well borne. In valvular lesions, when disturbance of the pulmonary circulation and hypertension in the right ventricle predominate, camphor is the most rational and efficacious remedy. The drug is also quite useful in the pulmonary sclerosis of tuberculosis and in arterial hypertension with hypertrophied heart, vascular spasm of climacteric origin, and arterio-sclerosis; it is capable of inducing beneficial changes in disordered function of the myocardium and especially of the right ventricle. In conclusion, Professor Marfori says that camphor must no longer be considered merely as a remedy in the hour of death, but rather as a drug which, when intelligently administered, is capable of producing beneficial results throughout the entire course of various cardiac and vascular diseases owing to its special properties, which are distinct from those of other heart drugs.

[1] Il Policlinico, Practical Section, June 17th, 1917.

LEAD POISONING IN CHILDREN.

LEAD poisoning in children is a condition which has received little or no attention in this country. Many cases have, however, been observed in Australia, and articles which have appeared in the medical journals there from time to time during the last 25 years constitute the important literature of the subject. As the symptoms differ somewhat from those in adults, on which all text-book descriptions are based, lead poisoning in children is probably often overlooked. One way in which Australian children have been poisoned is by contaminating their hands with the dried paint of railings and walls and then sucking their fingers or biting their nails. In the *American Journal of the Medical Sciences* Dr. K. D. Blackfan, of Baltimore, has published an important paper on lead poisoning in children and reported four cases. In early cases a change in disposition is often the first symptom noticed. The child grows fretful, peevish, and often very restless at night. The appetite declines, the breath is foul, and frequently hæmorrhages from the gums occur. The child may complain of pain in the epigastrium and legs. In cases of longer duration the pains in the abdomen become continuous and more severe. Constipation is the rule and vomiting is rare. The muscles are often so painful as not to permit of the weight of the bedclothes. The gait is described as characteristic. It is waddling; the patients walk on the outside of the feet, the toes are dragged, and with each step the legs are swung sideways before the feet are put to the ground. The attention of the parents may be attracted by one or more of these symptoms, but frequently nothing is observed until cerebral manifestations, such as convulsions, occur. Very few of the cases show the characteristic wrist-drop of adults. Paralysis of cranial nerves is usual, the facial and motor oculi, entirely or partly, being most frequently affected. Optic neuritis is also common. As a rule the temperature is normal, but it may be irregularly elevated. In fatal cases, especially in those with cerebral disturbances, it may rise as high as 105° or 106° F. before death. In early cases the symptoms may be only suggestive. Then other evidence, such as the

blue line on the gums and stippling of the red corpuscles, may be found. Direct evidence of lead poisoning may be obtained by finding the metal in the urine or fæces. The following are two of the cases reported by Dr. Blackfan. A boy, aged 2½ years, on March 8th, 1915, had a convulsion from which he recovered. On the 12th he was brought to hospital in convulsions which continued for 24 hours. They involved the eyes, the left side of the face, and the left arm. There were a leucocytosis of 19,000, stippling of the red corpuscles, a lead line on the gums, and an enlarged spleen. The fundi were normal and lead was not found in the urine. On March 26th convulsions involving the face and left arm recurred. They continued for 24 hours; the temperature rose to 107·5°, and he died. His father stated that he would gnaw any painted article and that he and his brother had ruined a set of parlour furniture by eating the paint off it. In another case a boy, aged 3 years, became drowsy on July 30th, 1915, refused food, and vomited. At night he was delirious. On August 1st he became comatose and had several convulsions. On the next day he was admitted to hospital. There was a lead line about several of the upper teeth, and a few of the red corpuscles were stippled. He lay in a condition of stupor for two or three days. There was a *tache cérébrale* and the neck was rigid. On the 5th he was much better, sat up in bed, and could walk, but there was incomplete paralysis of the right facial nerve. By the 12th he had quite recovered. The source of the poisoning was not known.

THE PROTECTIVE FUNCTIONS OF THE SKIN.

THE function of the skin as a mechanical protection to the organs which lie within it is so obvious that it may have led to the overlooking of other equally important protective functions. The skin as a whole may, of course, be regarded as an organ with a common and complete function of its own, to which view testimony is borne by the complete way in which it suffers in certain infectious diseases, such as scarlatina and variola; and it should be noted that it is precisely these infections in which the skin plays a large part where permanent or nearly lifelong immunity results. Professor B. Bloch, head of the dermatological clinic in Zürich, discusses some of these immunity problems in relation to the skin in a novel and suggestive way in the *Correspondenz-Blatt für Schweizer Aerzte* for August 4th. He notes how seldom general paralysis or tabes is associated with a cutaneous gumma in the same patient and how rare it is to see these late parasyphilides at all in countries where in consequence of defective treatment severe tertiary lesions are common in the skin. He quotes the statistics of Mattauschek and Pilcz to confirm the relative infrequency of tabes in patients with early abundant cutaneous involvement. Taken together these and similar observations lead Dr. Bloch to lay great stress on the allergic function of the skin, its reaction to an unwelcome intrusion of which it has once had experience. The classical researches of Richet, v. Pirquet, and Römer have shown how the cutaneous manifestations of tubercle are influenced by this function of allergy which regulates their clinical course as well as the anatomical structure of the tuberculous nodule itself. Cutaneous tuberculides are nothing else but the reaction of the forewarned skin of the chronic consumptive to any isolated bacilli brought by the blood stream. Historically it has been from studies of the skin—beginning with Jenner's vaccination and Koch's fundamental experiment of tubercle inoculation in the guinea-pig—that most light has been thrown on problems of immunity. Due in part to the fact that the skin is so favourably situated for exact observation, the fact probably remains that it is to the external covering of the body which we must look for the most important workshop of the immunisation. The struggle against attacking microbes from without has slowly adapted the skin and given it the ability to react against the parasites themselves as well as their toxins with the process which we now know as allergic inflammation. This function has been gradually acquired in the history of the race and of the individual, since neither the skin of the lower animal nor of the new-born child reacts in at all the same way as that of the human adult. In this quality Dr. Bloch sees one of the most important relations between dermatology and general medicine.

THE inaugural address at the London (Royal Free Hospital) School of Medicine for Women, Hunter-street, W.C., for the session 1917–18 will be delivered by Dr. Louisa Garrett Anderson, C.B.E., on Monday, Oct. 1st, at 3.30 P.M., the subject being "Ambition."

WAR SERVICE AND THE MEDICAL MAN: PENSIONS, GRANTS, AND ALLOWANCES.

WE have put together in concise form the various means through which the medical man, who has entered either the Navy or Army, is compensated for invalidism or loss of professional income, while the case of his death on service is considered in respect of pensions to widows and children. The new Royal Warrant is placed first, as it is not merely the most important organisation, but is part of the ordinary terms of agreement between employer and employed. Various agencies follow applicable in greater or lesser degree in different circumstances, and the source of further information if required is given in each case. The War Emergency Fund of the Royal Medical Benevolent Fund is placed last but one, as its intention is avowedly to supplement and fill in the gaps of the other agencies; the Medical Patriotic Fund of the British Medical Association last of all, as the fund is only to be instituted if others fail to coöperate or amalgamate.

MINISTRY OF PENSIONS: THE ROYAL WARRANT (July, 1917).

Object.—The draft Warrant issued by the Minister of Pensions in July deals with the retired pay of disabled officers (naval or military) and with the pensions of the families and relatives of deceased officers, with effect from April 1st, 1917, and the option of further retrospective effect if more favourable to the officer than his present retired pay. The actual schedules are given as follows:—

(1) *Retired Pay to Disabled Officers.*

Degree of disablement.	Percentage degree of disablement.	Retired pay on account of disablement.												Officers holding permanent commissions in Regular Forces.	
		Officers not holding permanent commissions in Regular Forces.													
		Major-General.		Brigadier-General.		Colonel.		Lieutenant-Colonel.		Major.		Captain, Lieutenant, or Second Lieutenant.		All ranks.	
	Per cent.	£		£	s.	£	s.	£		£	s.	£	s.	£	
1	100	350		325	0	275	0	250		225	0	175	0	100	In addition to retired pay under Royal Warrant of Dec. 1st, 1914.
2	80	280		280	0	220	0	200		180	0	140	0	80	
3	70	245		227	10	192	10	175		157	10	122	10	70	
4	60	210		195	0	165	0	150		135	0	105	0	60	
5	50	175		162	10	137	10	125		112	10	87	10	50	
6	40	140		130	0	110	0	100		90	0	70	0	40	
7	30	105		97	10	82	10	75		67	10	52	10	30	
8	20	70		65	0	55	0	50		45	0	35	0	20	

(2) *Pensions, Gratuities, and Allowances to Officers' Widows and Children.*

Rank.	Widow's pension.		Widow's gratuity.	Children's allowances.	
(1)	(2)	(3)	(4)	(5)	(6)
Field Marshal	£800	£600	£3500	£30	£25
General...	600	450	3000	30	25
Lieutenant-General... ...	500	375	2000	30	25
Major-General	400	300	1100	30	25
Brigadier-General	300	225	900	30	25
*Colonel	200	150	600	24	20
†Lieutenant-Colonel ...	180	135	450	24	20
Major	140	105	300	24	20
Captain...	100	75	250	24	20
Lieutenant	100	75	140	24	20
Second Lieutenant	100	75	100	24	20

* Colonel means an officer who has been employed in the rank of Colonel. † Including a Colonel not employed as above.

N.B.—Whether pension is granted to the widow on scale (2) or (3), and whether the gratuity (4) is added, depends on the particular circumstances attending the officer's death, and the same consideration applies to the additional children's allowance (6). Allowances are continued up to the age of 18 in the case of sons (with extension for purposes of education or apprenticeship) and to the age of 21 in the case of daughters.

Conditions.—Retired pay at temporary rates is given until disablement has reached its final condition, and a permanent pension then awarded cannot be subsequently altered to the officer's disadvantage. During special treatment pay at the highest degree of disablement may be received. In the case of total disablement the officer requiring the constant attendance of a second person may receive an additional allowance of £78 a year. When the degree of disablement is less than 20 per cent. a gratuity not exceeding £500 may be granted in lieu of retired pay.

Literature.—White paper, Cd. 8631, price 2*d.*, from H.M. Stationery Office.

MILITARY SERVICE (CIVIL LIABILITIES) COMMITTEE.

Object.—To grant pecuniary assistance to men, married or unmarried, serving with H.M. Forces who are unable by reason of undertaking military service to meet their financial obligations.

Benefits.—Applicants must *not* hold a commission, and must be ordinarily resident in the United Kingdom. Assistance is granted in respect of rent, interest and repayment of loans, instalments under agreements of purchase, rates and taxes, insurance premiums, school fees, but is not available for ordinary debts.

Amount.—Not to exceed £104 per annum (= £2 a week) paid quarterly.

Conditions.—The assistance may not be assigned and is liable to revision or withdrawal at any time. It ceases on discharge from the Forces. In case the grantee is reported dead or missing the assistance may be continued for 26 weeks to his widow or dependents.

Application.—Commissioners have been appointed for 45 districts in England, 3 in Wales, and 18 in Scotland. A list of addresses can be inspected at any post-office. Application should be made to the Commissioner for the district in which the applicant or his family resides, on a form obtainable at the post-office.

Literature.—A white paper, Cd. 8249, price 1½*d.*, from H.M. Stationery Office, gives all necessary information.

PROFESSIONAL CLASSES WAR RELIEF COUNCIL (INC.).

Object.—To assist the families of professional men whose circumstances have been adversely affected by the war. Those serving with H.M. Forces (without holding commissions) are advised to confer first with the Civil Liabilities Committee.

Benefits.—When granted these have been of a substantial character. Up to the issue of the last report assistance had been granted to the extent of £10,851 for the education of 631 children, 256 babies had been born in the maternity home, and 103 candidates helped with their training at a cost of £1300.

Application.—The central office of the Council is at 13-14, Princes-gate, S.W.7 (Tel. Kensington 6394 5). Chairman: Major Leonard Darwin. Chairman of executive: Dr. S. West. Honorary secretaries: Theo. G. Chambers, Alex. Goddard. Secretary: Miss Percy Taylor. Interviews by appointment only. There are eight members of the medical profession on the Council—namely, Sir Thomas Barlow, Lady Barrett, Sir Francis Champneys, Sir Watson Cheyne, Dr. G. Newton Pitt, Mrs. Scharlieb, Sir Frederick Taylor, Dr. S. West.

Literature.—The annual report for 1916 on application to the secretary.

OFFICERS' FAMILIES FUND.

Object.—To assist the wives and other dependent relatives of officers in the Navy and Army (including service battalions, the Territorial Forces, Indian Army, and Colonial Forces) who find themselves in financial embarrassment or other trouble owing to direct or indirect expenses resulting from the war.

Benefits.—Assistance is provided in the form of (1) money; (2) medical assistance, with the coöperation of doctors, nurses, and maternity homes (Florence Nightingale Hospital, Lisson Grove); (3) education, already given to 475 girls and boys (honorary secretary, Mr. E. H. Parry); (4) clothing (depôt for men at 2, Albert Gate, S.W. 5; for women and children at 29, Berkeley-square, W.1, managed by Lady Wilson); (5) business advice (chairman, Lord Justice Warrington; 2000 personal interviews have been given); (6) employment. During the two years 1914-16 in all 9506 grants have been made, amounting to nearly £200,000, while 476 widows and 172 mothers have been assisted.

Application.—The central office of the Fund is at Lansdowne House, Berkeley-square, W.1. Honorary secretary, Countess Roberts. Secretary, Miss H. M. Kelly. Interviews 11-1 (except Thursday and Saturday), or by appointment.

Literature.—A two-page leaflet on application. Report of two years' work up to August, 1916.

AUXILIARY R.A.M.C. FUNDS.

Object.—(*a*) Officers' Benevolent Branch: To assist the orphans of commissioned officers of the three auxiliary branches of the R.A.M.C.—viz., the Special Reserve, the Territorial Force, and the New Armies—serving during the present war. (*b*) Relief Branch: To assist the widows and orphans of the rank and file of the same branches. A similar fund has existed since 1820 in the regular R.A.M.C.

Benefits (of the Benevolent Branch).—Relief is given in respect of each orphan up to a maximum of £40 in a year, and to the age of 21 years (boys) or 18 years (girls). A female orphan has a claim if over 50 years and unmarried, or at any age if unfit. Loss of both parents constitutes a superior claim for relief, and priority is given to the relatives of officers killed in action, or who died of wounds or disease caused by active service. Donations are given, not annuities.

Application.—The office of the benevolent branch is at 124, Victoria-street, S.W.1 (Tel. Vict. 2722). President, Sir A. Keogh. Chairman, Major Ewen Maclean. Secretary, Lieutenant-Colonel E. M. Wilson. Application should be made on or before July 1st in any year, the distribution taking place annually in October.

Literature.—A four-page leaflet and a 14-page book of rules on application.

SOCIETY FOR RELIEF OF WIDOWS AND ORPHANS OF MEDICAL MEN.

Object.—To provide for the necessitous widows and orphans of its members.

Conditions of membership.—Membership is open to any registered medical practitioner resident at the time of his election within a 20-mile radius of Charing Cross. The annual subscription is £2 2*s.* Relief is granted in respect of life members and those of three years' standing.

Benefits.—A widow with an assured income of less than £100 a year receives £50 annually, *plus* £43 a year for each orphan up to 16 years of age. The Copeland and Brickwell funds permit of further grants in special cases. In the year 1916 £4223 odd was distributed, and on the last day of the year 48 widows and 9 orphans were in receipt of grants.

Application.—Secretary, 11, Chandos-street, Cavendish-square, W.1.

Literature.—The report for 1916, a four-page leaflet, on application; also a statement of receipts and expenditure for 1916.

WAR EMERGENCY FUND OF THE ROYAL MEDICAL BENEVOLENT FUND.

Object.—A special department of the Royal Medical Benevolent Fund to afford assistance to members of the medical profession who find themselves in temporary difficulties, consequent on having joined the Army Medical Service.

Benefits.—Grants on a liberal scale will be made in respect of rent, insurance, taxes, family maintenance and education, in so far as the needs are not met by any other existing fund if the necessary funds are forthcoming.

Application.—The office of the Fund is at 11, Chandos-street, Cavendish-square, W. 1 (Tel. Mayfair 1043). President, Dr. S. West. Honorary treasurer, Colonel Charters Symonds. Honorary secretary, Major G. Newton Pitt. The application will be investigated by one member of the committee of the Fund individually and laid before the Executive Committee anonymously.

Literature.—An appeal form on application.

MEDICAL PATRIOTIC FUND OF THE B.M.A.

At the last Annual Representative Meeting of the British Medical Association a scheme for loan fund for the protection and assistance of those who went to the war and on coming home found themselves in temporary difficulties was brought in by a subcommittee appointed for the purpose. A resolution as follows was passed:—

This meeting approves the principle of the Medical Patriotic Fund (Loan Fund) Scheme, and instructs the Council to consider and, if approved, to launch the scheme on the cessation of hostilities or earlier if the need arise unless in the meantime amalgamation or coöperation of existing funds shall render the establishment of an independent fund unnecessary or undesirable.

THE BIOLOGICAL ASPECTS OF WARFARE.

BY HARRY CAMPBELL, M.D. LOND., F.R.C.P. LOND.,
PHYSICIAN TO THE WEST-END HOSPITAL FOR NERVOUS DISEASES, LONDON.

II.*

The Two Sanctions of Conduct.

A MAN'S conduct both towards his fellow man and the lower animals has two justifications or sanctions—the self-regarding sanction of might and the "others"-regarding sanction of altruism.

Let us first consider the sanction of might—the justification, that is, for exercising might wholly or essentially in the interest of self. It is expressed in the phrase "Might is right." According to this sanction what might can do, that might is justified in doing. The first great truth we have to realise respecting the might sanction is that sheer might, wholly untempered by consideration for others, operates with inexorable effect throughout the whole organic world. In the struggle for existence living things have to contend against one another and against the forces of Nature, and in this struggle those go under that cannot successfully oppose might by might. As regards the struggle between living things, the most lowly may be pitted against and overcome the most exalted, as when man succumbs to a microbic disease, such as phthisis. In a life-and-death struggle of this kind there is no sanction other than might; the victim has meekly to submit to the inevitable. Nor has he from the biological standpoint great cause for complaint, seeing that from that standpoint the lowly tubercle bacillus has just as much right to live as man, the roof and crown of things.

Let us now ask ourselves how far the sanction of sheer might prevails among the higher vertebrates—(*a*) between the sub-human vertebrates, (*b*) between man and the latter, and (*c*) between man and man.

A.—The struggle among the lower animals is signally displayed in the case of the carnivora and their prey. Here we see the operation of might in its grimmest and most dramatic aspect. The sole warrant for the butchering activities of these animals is manifestly that of might, although it must be admitted that a measure of altruistic sanction comes into play in the case of the carnivorous mother when she slaughters for the sake of her offspring.

B.—We have seen that since the time the pre-human ape took to hunting he and his human descendants have wrought ruthless havoc among the lower animals. Here, again, the sanction is just that of the other carnivora—the sanction of might—the self-same sanction which permits the tiger to kill the deer or the cat the mouse. Biologically considered, the victims of man and the carnivora generally have just the same right to a place in the sun as their victimisers. Man may perhaps console himself somewhat for his indulgence in this wholesale slaughter by the reflection that if a race of superior beings were to descend upon this planet they would assuredly very speedily enslave or destroy the human race; and still more from the consideration, already urged, that it has been essentially through bloodshed that man has raised himself above the ape.

C.—The might sanction obtains widely as between man and man, both as regards the relations between separate communities, be they savage tribes or great nations, and those between the individual members constituting these communities. The sanction for that subjugation of weaker tribes by stronger which has taken place throughout the entire period of man's tribal career has manifestly been that of might simply. And so, too, as regards the warfare between civilised nations. Even in this year of grace the dread arbitrament of war still continues to be the sole means for settling disputes which cannot otherwise be adjusted. The great nations of the world still refuse to lay aside their arms and submit their disputes to an international tribunal. Men like Treitschke and Bernhardi boldly proclaim that in international disputes might is right, and openly advocate the cultivation of the martial spirit and a prompt resort to arms, if by their means the power and influence of the Fatherland seem likely to be extended. The only gleam of better things comes in the fact that the great powers of the Entente are fighting not only in their own cause but in that of the small, i.e., the weak, nationalities.

Again, among the individual members of a community, tribal or national, we find the strong dominating the weak. This is true even of advanced civilised communities. Actual personal combat is still in some degree sanctioned in the case of the comparatively harmless schoolboy fight and in the more formidable duel. Happily, the latter method of settling personal differences has long since been given up in this country. It is a flagrant instance of the might sanction in its most primitive form: one man injures another; the injured person challenges the injurer, but far from being certain of getting reparation, he as likely as not receives additional injury, if, indeed, he is fortunate enough to escape with his life. Here the sanction is just the same, and just as little justifiable on rational or ethical grounds, as when two great nations engage in war.

The individual is not, of course, permitted unreservedly to exercise the might sanction in his own interests within the State. Without some restrictions (to be considered later) no community could hold together. Nevertheless, these restraints, considerable though they be, leave wide scope for the exercise of personal might in the interest of self, and there are few who fail to take advantage of it. The tendency is for everyone to use such powers as he is free to exercise, without actually breaking the law or acting in violent defiance of public opinion, for the purpose of securing for himself the good things of this world.

The exercise of might within the sanction of the law falls under two categories, though it is not easy to draw a sharp line between them. We may speak of them as the illegitimate and the legitimate.

The illegitimate though legalised exercise of might includes conduct which, though essentially immoral, is yet permissible by law, the fact being that in a complex social system no code of laws can be devised which shall take account of every possible form of immoral dealing. Hence it is possible for a person, without breaking the law, to use his might in a manner which has little or no moral justification. Large fortunes are made in ways which, though not illegal, are yet violently opposed to the spirit of altruism, as in the case of the man who establishes a corner in wheat, the employer who sweats his workers, the usurer who lends money at exorbitant interest. Many of these procedures are sanctioned by general consent, though they are little more than modes of legalised robbery. Has not the informed and skilful speculator something in common with the house-breaker? Each uses his skill in annexing the property of others by taking advantage of their ignorance, while he renders no manner of service to the State. Is it not, again, a matter of daily experience that when a person, no matter what his social position, has the legal power to squeeze another in his own interest he seldom fails to take advantage of it?

We come now to the second category—the legitimate exercise of might in furtherance of self-interest. Some people are endued with greater powers than others, and society sanctions the exercise by the individual, in furtherance of self-interest, of such powers as he possesses, provided he does not infringe the law or act in flagrant defiance of public opinion. Herbert Spencer's formula of Justice runs thus: "Every man is free to do that which he wills, provided he infringes not the equal freedom of any other man."

Now, it will be found on ultimate analysis that the sanction here is not that of ideal justice—at least, not of ideal justice as I conceive it—but just that of might. Ideal justice demands, so it seems to me, that all shall start life equally endowed (both as regards native powers and worldly goods), and further that all shall be afforded equal opportunity. But neither of these conditions obtains or can obtain. Nothing is more certain than that all are not equally endowed: Dame Fortune distributes her favours in an entirely haphazard fashion. Some are gifted with a larger native endowment than others in the matter of health, beauty, intelligence, force of character, or what not, and are able to reap corresponding advantages. Some, again, are born rich, others poor, and what cannot the power of wealth accomplish? The moneyed fool can command the service of multitudes and enjoy in abundance the good things of this world, while the penniless genius may starve in a garret. Then as regards differences of opportunity. Some are born under conditions affording little scope for native endowment to come by her own. Village Hampdens and mute inglorious Miltons are more common than we think. A man who

* Article I. was published in THE LANCET of Sept. 15th, p. 433.

attains to modest eminence in a small provincial town might, had he sought his fortune in the New World, have made his millions; or a village beauty who, like the heroine of that beautiful poem "Maud Muller," has had to content herself with an uncouth swain for consort, might, had she been afforded the opportunity to display her charms behind the footlights, have blossomed into a peeress. Power without opportunity is powerless.

Under ideally just conditions, which require that each and all shall be equally endowed as to person and opportunity, no one could secure an advantage over his fellows from the possession of an extra share of might. It may be argued that even under such conditions it would still be possible for some by superior industry and grit to outstrip others in the race for life's prizes and thus secure a legitimate reward for having of *their own free will* made the best of their talents. To which I would reply that this very industry and this very grit are part and parcel of the individual endowment. Here we are up against the old question of the freedom of the will. To me it seems that equality of endowment implies equality as regards industry and force of character, and that feelings, thoughts, and acts conform to undeviating laws.

We thus see that ideal justice is not possible, but we are not on that account to suppose that everyone ought to forgo the special benefits which blind fortune may have bestowed upon him, or that an attempt should be made to secure ideal justice by a quixotic altruism. It is idle to strive after the impracticable or to seek to over-ride the great biological law of struggle: throughout all living nature the battle is, and ever will be, to the strong. A vigorous individualism, subject to necessary legal restrictions and tempered by a generous altruism, is the ideal to be aimed at. Subject to these reservations, might is a legitimate sanction. My object has merely been to show that this sanction operates with potent effect, even in the most advanced and best-regulated communities.

(*Note.*—The conclusion here arrived at as to the legitimacy of exercising might within the limits specified has the authority of Herbert Spencer. He points out that, except in the case of the immature, throughout the entire animal kingdom the benefits received tend to be in direct proportion to the merits possessed, an arrangement which necessarily secures the survival of the fittest. "Each individual," he insists, "ought to be subject to the effects of its own nature and resulting conduct," a principle which among the lower animals holds good without qualification. Among men there is an instinctive craving for freedom of action, and Spencer maintains that this freedom should be permitted so long as it does not interfere unduly with the freedom of others.)

The Checks to the Operation of Might.

We have seen how the might sanction operates throughout the entire animal kingdom, and how even in advanced human societies its potency is far greater than appears at first sight. Let us now consider more particularly some of the restraints which limit its operation. Among the most effective of these is the altruistic prompting which leads parents to tend their offspring. This parental instinct is now recognised to be the foundation of all altruism—the generous impulse to work in the interest of others rather than of self.

All animals which tend their young must at least be endowed with just so much altruism as pertains to the parental instinct, whether maternal, paternal, or both. (In the case of mammals the care of the young is for the most part limited to the mother.) It is, moreover, necessary that the entire family group shall be pervaded by something akin to the altruistic spirit, or at least that the members of the group shall not act antagonistically to one another, in order that they may cohere and live in harmony together. In the case of the non-gregarious animals this parental and family altruism constitutes the sole check on the might sanction. Save for its influence the non-gregarious animal (the tiger, for instance) employs all its powers for selfish ends alone.

In the case of gregarious animals other checks come into play, but before dealing with these it will be well to examine into the purpose of gregariousness. Its object is mutual help. By union into an organised community the welfare of each animal in that community may be promoted. Thus the capture of prey may be facilitated, as in the case of the wolf which, by hunting in packs, can secure a more ample supply of food than by individual effort; or again, the union may serve the purpose of protection, as in the case of many of the herbivora (e.g., the deer and the ox), for the herd not only presents a united front to the enemy, but by the multiplicity of its organs of scent and vision is so much the more appreciative of approaching danger. Man's gregariousness has a similar *raison d'être*. That primitive human families combined into tribes for utilitarian purposes we are very sure. Their union enabled the men to coöperate in the hunt and the women in the gathering and preparation of vegetable food, while it served the further purpose of protection against enemies, human or other. The interest of this utilitarian communal life as bearing on our present inquiry lies in the influence it has had in creating checks on the régime of pure might—checks which, becoming increasingly stringent with the development of communal life, have attained to greatest stringency in the most advanced civilised communities.

And first as to the checks on the operation of might among infra-human communities. My remarks on this head must be brief. It is obvious that no community could hold together if each member worked for its own interest without any reference to its fellows. Some psychic influence, antithetic to the purely egoistic manifestation of might and tending to secure the cohesion of the whole, must be at work. And such is undoubtedly the case. Thus some glimmer of altruism may be observed among the members of the herd in the shape of mutual help, and, again, a harmful assertion of might on the part of one member of the herd may lead to its being chastised by other members or even outlawed from the community, as in the case of the malicious rogue elephant. In short, each member of the herd needs to discipline its conduct in due regard to the others in order that all may live together harmoniously and coöperate for common ends.

And as with infra-human so with human communities—the individual members need to be bound together by psychic influences, which constitute so many restraints on the purely egoistic might sanction. When families began to unite into tribes the altruism, until then confined to the family group, extended to the entire tribe, for some measure of mutual help, however small, was necessary to its cohesion. This also required that certain rules of conduct should be observed, rules which, indeed, in many cases developed a complexity out of all proportion to their usefulness (as in the case of those in force among the Australian aborigines). These rules were not deliberately framed, but grew up spontaneously and were perpetuated and emphasised by tradition. Nor were they enforced by an executive, but simply by public opinion, fear of which ever constitutes an effective check on unconventional conduct. Disputes between members of the tribe—private wrongs such as theft and even murder—were settled privately. The injured persons took the law into their own hands (as we say) and avenged themselves as best they could by retaliation, the fear of which, like the fear of public opinion, always operates as a useful restraint.

It was not, indeed, until a comparatively late phase of social evolution that Government undertook the protection of the individual. In the first instance, its sole concern—its *raison d'être*, in fact—was the military one of protecting the community against external foes, tribal customs enforced by public opinion, and the fear of retaliation against private wrongs, aided by some measure of altruistic spirit, sufficing to maintain the integrity of the tribe. But something more than these was necessary to protect the tribe against outside enemies. This demanded a central authority in the person of a chief or king, whose business it should be to weld the manhood of the tribe into a fighting force. Needless to say, that at this primitive phase of society there was no question of exemption owing to conscientious motives. The first duty of all the able-bodied men—and these comprised practically the entire manhood of the tribe—was to preserve the integrity of the tribe against attack. We have thus an ancient precedent for universal military service. Assuredly the first duty of a government is now, as it was at the first beginning of communal life, to secure adequate defence of the state against its enemies, and to compel, if need be, all its able-bodied manhood not otherwise required to take up arms against the common foe. The man who is deaf to this elemental call of duty is an

undesirable from the eugenic standpoint. From such as him we are little likely to breed a virile race; we must not, we cannot, allow our bravest and best to be killed while the faint-hearted are left to perpetuate the race.

As society developed government undertook the duty of protecting the interests of the individual by enacting and enforcing laws, and thus a further check was put upon the operation of might. Meanwhile another and most powerful restraining influence had come into operation—the fear of divine vengeance. But to trace the growth of the religious element in man would take me beyond the scope of this essay and I merely name it.

The operation of these various checks during countless generations has had a profound influence on man's affective nature. There has evolved in consequence of them a disposition to act in accordance with the requirements of complex social life, for on the whole those most amenable to social discipline and those most altruistically disposed have survived at the expense of the anti-social and the egoistic: there has evolved, in short, a disposition to act morally (i.e., dutifully towards our fellows), and a corresponding sense of justice has been built up. Thus it has come about that from the first institution of communal life among men there has been a steady weakening of the might sanction, so that to-day civilised man revolts against its unbridled exercise. He realises that while it is excellent to have a giant's strength it is tyrannous to use it like a giant, and he applauds the "noble doom" which Posthumus imposes upon the man who has wronged him:—

> Kneel not to me:
> The power I have on you is to spare you;
> The malice towards you, to forgive you; live,
> And deal with others better.

It will thus be seen that just as communal life has evolved on a utilitarian basis, so also has morality; its function is neither more nor less than the maintenance of the integrity of the social organism. From the biological standpoint it has no other significance. Nor must it be forgotten that sheer might has also its range of usefulness in the animal world, a wider even perhaps than that of altruism. Each is but a means to an end, and biologically neither merits commendation or condemnation more than the other.

(To be concluded.)

PARIS.

(FROM OUR OWN CORRESPONDENT.)

Ear Protection against Concussion.

NUMEROUS symptoms in combatants due to the effect on the ears of the explosion of large projectiles have led to the consideration of equally numerous means for the protection of the hearing apparatus. Gunners are advised to keep their mouths open at the moment of firing. For the unexpected bursting of projectiles various methods of protection have been recommended, but it has been found necessary to discard all—among them cotton-wool pads—which appreciably diminish the perception of sound and so prevent the soldier from hearing the word of command. In practice hollow perforated obturators are the best. These are placed in the external auditory canal so as to allow of the passage of sound waves through the double perforation, while the cavity arrests the force of the larger waves, so that they reach the drum membrane much attenuated. MM. L. and M. Vérain have laid two models of these obturators before the Academy of Medicine. They are made of celluloid or aluminium in the shape of an olive and are perforated at each extremity. In one model each hole leads by a T-shaped tube into the interior. The simpler method is divided into two compartments by a transverse diaphragm pierced by a simple hole from which a small hollow rod penetrates into the anterior compartment. More than 600 pairs of these obturators were employed in two months in an artillery regiment, and during this time not a single case of tinnitus, vertigo, hæmorrhage, or obstruction by wax was observed. M. Jacques, of the 8th Army, is responsible for a still simpler model consisting of a spherical capsule of gelatin, such as are used to contain medicaments, after emptying the contents through a small hole pierced at each end. The size of the hole is regulated by the sensitiveness in the particular case. The results obtained with this model have been as satisfactory as with the others.

Professional Secrecy and the Exposure of Criminal Abortion.

Feeling runs strong in French medical circles in regard to the proposal under discussion at the Academy of Medicine dealing with the causes of depopulation and the strenuous repression of abortion, and numerous articles are appearing in the medical and lay press. The proposal is to release the medical man from his obligation of professional secrecy when he is called to appear for the prosecution in case of a criminal abortion of which he has professional knowledge. M. Berthélémy, professor in the Parisian Faculty of Law, recently declared before the Société de Médecine Légale that the abortion danger had become so great as to render advisable abolition of the obligation to professional secrecy and of the impunity to the guilty which this obligation conferred. The society adopted this view, with the rider that the doctor should not be liable to prosecution if he believed he had answered conscientiously the questions put to him by the legal authority; and that it was his duty to take the initiative in denouncing the authors of abortion when he learned of them through the confession of his patient, since such persons were outside the protection accorded by the obligation of secrecy. Dr. Lepage, a hospital accoucheur, believes that the reform will have no practical value, because the doctor can rarely be certain of the measures taken to produce abortion unless he possesses a formal confession from the patient, which the latter will hesitate to give, not being herself protected by the seal of secrecy. M. Doléris regards the duty of exposing the authors of abortion as an absolute one, constituting the only means of restraining their nefarious activities. The president of the Society of Medical Practitioners declares, on the other hand, that professional secrecy should be observed in all circumstances, for otherwise patients will no longer venture to confide in their doctors, and thus remaining unattended will die in greater numbers than before without any reduction in the number of abortion-mongers. The controversy continues.

Sept. 10th.

THE CONTROL OF VENEREAL DISEASES.

Prohibition of Unqualified Treatment.

ACTING on the powers conferred upon it by the Venereal Disease Act, 1917, the Local Government Board has prohibited, from Nov. 1st next, the treatment of venereal disease, except by duly qualified persons, in the counties of Buckingham, Cambridge, Durham, Essex, Hereford, Hertford, Isle of Ely, Kent, Leicester, London, Middlesex, Norfolk, Northampton, Northumberland, and Surrey, and in the county boroughs of Bootle, Bradford, Cardiff, Coventry, Croydon, Darlington, Dewsbury, Dudley, East Ham, Hastings, Leeds, Leicester, Newcastle-upon-Tyne, Northampton, Norwich, Portsmouth, Sunderland, Tynemouth, Wakefield, Warrington, and West Ham. Persons contravening the provisions of the section are liable to imprisonment for two years or to a fine of £100.

The City of London Treatment Centre.

The treatment centre which was recently opened by Lieutenant-Colonel W. R. Smith, R.A.M.C., chairman of the Sanitary Committee of the City Corporation, is situated at the City Shelter, 19-20, Golden-lane, E.C. The times of attendance are: For men, Wednesdays 12–2 and Fridays 5–7; for women and children, Mondays 12–2. Captain W. Girling Ball is the officer in charge. The initial outlay on the centre has been about £1400, and the annual working expenses are estimated at £1800, plus £400 for salvarsan.

National Council for Combating Venereal Diseases.

Following on successful public meetings, local branches of the National Council have recently been formed at Manchester and at Canterbury.

Venereal Disease and Marriage.

At a recent session of the New York State Legislature an amendment to the Domestic Relations Law was placed on the statute books requiring all persons applying for a marriage licence to take the following oath:—

> I have not to my knowledge been infected with any venereal disease or if I have been so infected within five years I have had a laboratory test within that period which shows that I am now free from infection from any such disease.

The mere taking of such an oath will naturally not make

absolutely certain that both parties are free from infection at the time of marriage, but the new law will nevertheless exert an important educational influence on public opinion.

Compulsory Detention in South Africa.

Dr. Chales Porter, medical officer of health of Johannesburg, has reported to the municipal council that under the Local Government Ordinance, 1912, Section 72 (3), the council has power to make by-laws for preventing the outbreak and spread not only of infectious diseases, but also of contagious diseases, and for the segregation and treatment of sufferers from contagious diseases, the word "contagious" having been inserted at the suggestion of the medical officer of health. Several specific instances have come to the notice of the medical officer of health in which a sufferer from venereal disease in a contagious condition has refused to go to the isolation hospital or to remain there, with resulting danger to those with whom he comes in contact. The medical officer of the prison has represented that at present he is compelled to discharge uncured from his hospital at the expiration of their sentences both white and coloured persons suffering from various forms of venereal disease, often in a highly contagious state. In view of these facts the health committee has recommended to the council to make the following new by-law :—

When any person is suffering from any contagious disease, and when, in the opinion of the medical officer of health, the removal of such person to a suitable hospital or place of segregation and his detention or treatment therein are necessary for the protection of the public health, the council may order and compel the removal and treatment of such person in such hospital or place of segregation and his detention therein until in the opinion of the medical superintendent of such hospital or place of segregation he has ceased to be in a contagious condition. In the event of any such contagious person resisting such removal or detention, any official of the council or any police constable or other person authorised thereto by the council, and any official of the place of detention, may employ such force as may be necessary to compel such removal and detention. Any such person who resists such removal or resists or wilfully evades such detention shall be liable to a penalty not exceeding fifty pounds (£50), or, in default of payment, to imprisonment for a period not exceeding three months.

The Interpretation of the Wassermann Reaction.

The London County Council has issued, for the use of its venereal treatment centres, a memorandum originally drafted by the pathologist of one of the London hospitals, and embodying certain additions suggested by other pathologists of treatment centres. The enormous number of tests, which have been made during the ten years since the reaction was introduced, have left no doubt, the memorandum states, as to the meaning to be attached to definitely positive or negative results in the great majority of cases, but in regard to certain points it cannot be said that universal agreement has been reached. The conclusions suggested in these special cases represent only the general trend of opinion. The Wassermann reaction is a quantitative one—i.e., it depends on a certain phenomenon occurring to a certain degree, and hence there will always be borderline reactions, which, while showing a distinct departure from the normal, are not sufficiently marked to serve as a basis for a definite diagnosis save under special circumstances. Such reactions, when they occur, must be carefully considered in relation to all the known facts of the case in question. After discussing in succession the reaction in diagnosis, the effect of treatment on the reaction, the reaction in the control of treatment, and the reaction as a criterion of infectivity, the following conclusions are given :—

1. A well-marked positive reaction is undoubted evidence of syphilitic infection, with the few unimportant reservations outlined above.
2. A single negative result has no value during the first few weeks of the disease. At this stage the sore should be examined for the *Spirochæta pallida*, and if the result be negative the blood should be tested after a short interval, during which no treatment has been given.
3. A negative result in a patient undergoing treatment has no diagnostic value. If the diagnosis be uncertain the test must be repeated after a treatment-free interval lasting for several weeks at least.
4. A negative result in an untreated case exhibiting suspected secondary lesions almost excludes syphilis, but never does so absolutely.
5. In the later stages, with certain exceptions, a rather higher proportion of undoubted syphilitic cases give negative results; so that such a result, while contraindicating a diagnosis of this disease, especially if previous anti-syphilitic treatment can be excluded, must be regarded in relation to all other available evidence.
6. In using the reaction to control treatment the ideal aimed at should be a persistently negative reaction following a prolonged and thorough course of treatment, as explained above. This result, combined with the absence of all clinical signs, is the best evidence of non-infectivity.
7. A weak positive reaction must always be considered in relation to all the known facts of the case, and has little diagnostic value alone.

The memorandum closes with drawing the attention of medical practitioners who wish to take advantage of the laboratory facilities provided by the local authorities to the following suggestions :—

1. The facilities are intended for cases of venereal diseases *in their early and in all communicable stages.*
2. The examination for spirochætes is most efficient when the patient attends for the purpose at the treatment centre.
3. It is understood that the pathologists may refuse to perform any tests in the following circumstances: (*a*) when the material arrives in an unsatisfactory condition; (*b*) when the form of particulars is not completely filled up by the practitioner.

Enlightenment Campaign amongst American Recruits.

Dr. C. F. Bolduan, director of the Bureau of Public Health Education for the City of New York, writes to us of the advantage taken of the opportunities of sexual enlightenment offered by the recruiting for the United States Army. In New York City there were 188 exemption boards who medically examined more than 150,000 recruits. In coöperation with the New York Social Hygiene Society the City Department of Health prepared a pamphlet for distribution to the drafted men being examined and asked the examining officers to hand a copy to each man examined by them. The pamphlet, which is entitled "Universal Service and Physical Fitness," is of eight pages, and gives a graphic account of the devastating effects of venereal infection. One page is devoted to a telling pictorial illustration of the triple alliance between alcohol, prostitution, and quackery; another to exploding the theories of the necessity and justification of illicit intercourse. On the cover stands the motto: Public health is purchasable. Within natural limitations a community can determine its own death-rate.

Experiences of an American Venereal Dispensary.

In the *American Journal of Public Health* for May Dr. Alec N. Thomson, of New York City, gives an account of the dispensary problems of gonorrhœa and syphilis as encountered in the work of the genito-urinary department of the Brooklyn Hospital Dispensary. Established in 1904, by Dr. Rathbun as sole worker, it now occupies 15 doctors at six afternoon, seven evening, and two morning clinic sessions. The aim of the clinic is to bring the patient under treatment and retain him until cured, and no pains are spared to ensure this. When visits are omitted a reminder is sent in a sealed envelope, repeated again where unnoticed, and finally with the stamp, "Your last chance." Above the door of the waiting room to the clinic are two large signs reading, "You must come to the clinic regularly for treatment," and "Do not stop treatment until the doctor tells you that you are well." Each new case admitted to the dispensary also receives a ten-page pamphlet upon venereal diseases. Metal plates offering the facilities of the Department of Health for advice and diagnosis, and of the Brooklyn Hospital Dispensary for the treatment of diseases of men have been placed in a number of saloon and factory toilets, replacing in many cases the quack signs. Dr. Thomson is convinced that it pays to advertise. Publicity and education will, he says, deprive the quack of his biggest assets—mystery and ignorance. Affiliation with such other bodies as the American Social Hygiene Association is essential to this end.

AWKWARD PRESCRIPTIONS.

BY A. W. BROMLEY,
PHARMACIST.

To a pharmacist an awkward prescription is one containing a chemical incompatible, an ambiguity, an error, or an unusually large dose. In the last case, the dose may be intentional on the part of the prescriber for some special or heroic reason, or merely a verbal or arithmetical slip. The obvious course in all such difficulties is to appeal to the prescriber if he is accessible. But there are many cases where that is not possible or desirable. One cannot delay a prescription, obviously urgent, to consult the writer in a distant town. I once posted a doubtful prescription to its author in the West-End. It followed him to Scotland, and I received it back in four days. That is an extreme case, but I have had delays of several hours, where prescribers live quite close to me, and even a delay till the next morning.

Many doctors would perhaps define an incompatible either as a "messy mixture" or as a chemical decomposition. Neither definition is good. An incompatible mixture may be quite elegant and, of course, many decompositions are not incompatibilities. I would rather define a chemical incompatibility as a decomposition in which the chemical or physical properties of the result are different from the intention disclosed. Of course, an incompatibility may not be chemical. An acid added to an emulsion would generally produce a physical incompatibility. Most incompatibles that arise in practice are crude and obvious, but a few are interesting. If a trifling omission, addition, or substitution will set them right, all but the fussiest pharmacists would do that without troubling the prescriber. But, of course, the change must be of no medicinal importance. Sometimes, without medical knowledge, it is possible to anticipate the normal prescriber's mental process in a prescription difficulty and deduce his inevitable decision. For example, I omitted glycerine from a potassium permanganate gargle. Obviously they could not be put together, nor could a substitute be introduced; the prescriber's way out of the difficulty was inevitable. To assume that he would discard his carefully-selected main ingredient for the sake of a demulcent would be to convict him of weak judgment in prescribing. An equally clear case was a mixture of quinine and iron citrate, and sal volatile. The latter might be wanted for its alkalinity, its stimulating effect, or as a flavour. The first two purposes are defeated by the acidity of the citrate; it can only act as a flavour. So an appropriate quantity of lemon and nutmeg essences was substituted. A mixture of sodium salicylate, sodium bicarbonate, and tincture of iron was cured by substituting iron and ammonium citrate for the tincture. In this case the prescriber was told, and he approved; in the others the matter was decided as too trivial to communicate.

A dangerous but extremely common incompatible is a mixture of solution of strychnine with alkalies. Yet it is by no means undispensable. Strychnine is slightly soluble in water, and it becomes a question of where the danger-point is. Theoretically, the most that is safe is about half a grain (50 minims of solution) in 8 oz. But a drachm in 6 oz. is dispensed every day, with a "shake" label of course. Trouble could only arise through a very remote coincidence. The patient would have to pour out very carefully without shaking all but the last few doses, and then reform and shake thoroughly. Such procedure would yield doses ranging from 0·6 to 1·5 or more of the dose prescribed. Pharmacists do not like these mixtures that rely upon the patient's intelligent obedience. I should dispense a tablespoon mixture double size with ounce doses if the strength exceeded 10 minims per ounce.

A very interesting incompatible is the decomposition of chloral hydrate by alkalies. It can scarcely be regarded as dangerous, or even seriously objectionable; probably the decomposition is not always completed in mixtures occurring in practice. If it is completed the patient gets the sudden action of chloroform instead of the gradual action of chloral. As a rule, pharmacists would dispense as written without comment; if the prescriber himself brought the prescription one might raise the point.

Ambiguities arise through bad writing, close similarities in the names of drugs, and synonyms that have more than one meaning. It is curious how one can master the details of a prescription by inference from its general construction when not a single word can be read. Only when a bad writer happens to be also an eccentric prescriber does he create insurmountable difficulties for the dispenser.

Sometimes, possibly only in moments of irritation, a prescriber expects one to carry the process of deduction too far. I once took a defective prescription to its author, and, after correcting it, he asked what I should have done had he been inaccessible. On my mentioning two alternatives, he remarked, "Either would have suited me and been better for the patient than this delay." In another case I received an urgent order for 3-minim amyl nitrite capsules. Not having them, I sent the messenger hurrying to my nearest colleague. Next day the doctor told me that, considering the obvious emergency, I should have supplied 5-minim capsules rather than send the messenger away. One can see the point of view here without agreeing. A pharmacist cannot solve doubts by guess, only by reasoning which must at least be sound to himself.

Correspondence.

"Audi alteram partem."

THE "HÆMOGREGARINE" OF TRENCH FEVER.

To the Editor of THE LANCET.

SIR,—In THE LANCET of Sept. 8th, in a paper entitled "Trench Fever, or P.U.O., associated with the Presence of a Hæmogregarine," Captain Lyn Dimond, R.A.M.C., announces the discovery of hæmogregarines in human blood. If this statement should prove to be correct, then a discovery of the first magnitude has been made, as such parasites, though occurring in reptiles, amphibia, &c., and in some mammals (dog, rat, jerboa), have not so far been found in man. In view of the importance of Captain Dimond's find, therefore, it behoves tropical workers and protozoologists critically to examine his results to see if they are well founded and accurate. A study of the somewhat rough pen-and-ink sketches which accompany the paper is certainly not convincing, and the feeling of doubt which these give rise to is increased when the life cycle described for the hæmogregarine is taken into account. This, as compared with the cycle which has been worked out for the hæmogregarine of the lizard and rat, is inaccurate in many respects, and is largely based on hypothesis, with no definite facts to support it. Further, even granting for a moment that the bodies seen are hæmogregarines, there is no evidence that they are pathogenic or the cause of trench fever. This is borne out by a statement made by the author towards the end of his paper, that since completing it he has had opportunities of confirming the presence of the hæmogregarines in a number of other cases of trench fever, and also in addition in cases of D.A.H., complicated with some of the clinical signs of P.U.O., and in one or two cases of definite benign tertian malaria. It is strange, if hæmogregarines are present in the latter disease, that they have never been seen before by workers in tropical medicine. I have said enough to show that urgent confirmation of the discovery is required, and until this is forthcoming the matter must remain *sub judice*. Recommendations have been made to puncture the lungs and other viscera in order to obtain venous blood, a somewhat dangerous procedure for all and sundry to adopt, and flavine and other drugs have been used for treatment. There is no justification for this until it is definitely shown: (1) that the bodies described are hæmogregarines, and (2) that they are pathogenic and the cause of the disease. Sir David Bruce, President of the Society of Tropical Medicine and Hygiene, and the Fellows generally will, I am sure, be only too pleased to give Captain Dimond the opportunity of demonstrating his parasites before them, and expert opinion will then be available to test their validity.

I am, Sir, yours faithfully,

GEORGE C. LOW, M.D.,
Temp. Captain, I.M.S.; Lecturer, London School of Tropical Medicine; Joint Secretary, Society of Tropical Medicine and Hygiene.
Bentinck-street, W., Sept. 15th, 1917.

To the Editor of THE LANCET.

SIR,—In your issue of Sept. 8th you publish an article by Captain Lyn Dimond, entitled "Trench Fever, or P.U.O., associated with the Presence of a Hæmogregarine." From a leading article in the same issue, and from personal communications and interrogations which I have received since the appearance of this work, I gather that there is, in some quarters, a tendency to regard Captain Dimond's findings favourably, and to conclude that he has discovered in man a new protozoal parasite—a hæmogregarine—which is the cause of trench fever. I therefore ask your permission to make a few comments, from the point of view of a protozoologist, upon this remarkable publication.

In the first place I would point out that Captain Dimond's statements are frequently very difficult for a protozoologist to understand, since he displays a singular disregard for the language of our science, and I may perhaps have failed to seize his meaning in consequence. When, for example, he

describes his "hæmogregarine" as undergoing multiplication by the "sporulation" of a "parthenogenetic gametocyte" into "merozoites." he produces a feeling of bewilderment in his readers; for this, translated from the *patois* of protozoology, as applied to Sporozoa, into common English, means that the bisexually produced germs, or spores, of the parasite are asexually-produced young produced unisexually. It is difficult to know what meaning to attribute to such propositions, but reference to the illustrations permits one to make a plausible guess. Are not Figs. I.-IV., the "parthenogenetic gametocytes," in reality sketched from dried and stained cellular elements of the human spleen or liver? And are not the "20 parthenogenetically produced merozoites" of Fig. V. in reality 19 bacteria? Their resemblance to these things is undeniable, whilst their lack of resemblance to any known stages in the life-history of a hæmogregarine is equally undeniable. We now know the life-histories of a few species of hæmogregarines almost completely, of several others in considerable detail, and of the numerous remainder in consistent fragments. But nothing like the remarkable development outlined by Captain Dimond for his "hæmogregarine" has previously been brought to light. Indeed, there is not only no hæmogregarine which develops like his, but there is no known protozoon whatever like it. To the best of my knowledge it is unique in many ways among all known organisms.

Figs. VI. and VII. are more difficult of interpretation. It is not possible to discover what they really represent. They bear, indeed, some resemblance to hæmogregarines, but also display some notable differences. The intracorpuscular "parasites" of Fig. VIII. are also difficult of interpretation. They appear to inhabit red blood corpuscles of extraordinarily small size (one is two and a half, the other slightly over three microns in diameter) and to be themselves far smaller than any ordinary hæmogregarines. On comparing the descriptions with the figures, and taking the rest of the "life-history" of the "protozoon" into account, no protozoologist would, I believe, care to express a very definite opinion on these forms until he had studied the actual specimens from which they were drawn. There are so many pitfalls in the path of the unwary hunter of blood parasites, and the cautionary stories of "*Paraplasma*" and "*Anaplasma*" are still so fresh in our memories, that one is chary of expressing an opinion prematurely in such matters.

After reading Captain Dimond's article, therefore, I immediately wrote to ask him to allow me to examine his preparations. I thought his published statements might become intelligible when taken in conjunction with the actual objects of his descriptions. He must, I inferred, possess a very large number of preparations containing all the stages which he describes or mentions and a vast number of intermediates, since he describes with much confidence a life-cycle of great complexity and novelty. In answer to my request I have received a letter (from Major W. Byam) in which it is stated that a further report is in preparation, and when that is complete he "hopes *to prepare* and forward smears" for my examination. "For the present," he says, "we feel that both microscopical and clinical demonstrations would take more time than we can afford." This being the case, therefore, there is little further discussion possible at present. It is only just to remark, however, that the account of the "hæmogregarine of trench fever" can only be accepted when a complete series of preparations is produced in evidence, or when its existence and its almost incredible life-cycle are independently confirmed by a protozoologist of unquestionable competence and repute.

It is unfortunate that Captain Dimond did not take the precaution of consulting a protozoologist with first-hand knowledge of the hæmogregarines, and also of consulting the somewhat extensive literature dealing with this group of protozoa, before recording his findings. Had he done so he could hardly have published his work in the form in which it now appears. He would also, probably, have saved himself much trouble and labour. For example, it appears that he is now seeking the further developmental stages of his "hæmogregarine" in lice, which he regards as being, with "extreme probability," the intermediate hosts. He says, further, that "the presence of such large numbers of rats in the trenches which come into close association with our troops seems to favour this conclusion." Assuming that he means that the rats, and not the trenches, associate with our troops, it is extremely difficult to follow his train of thought. It is true that a louse—*Hæmatopinus stephensi*—to which he refers is believed to be the intermediate host of the hæmogregarine of the Indian gerbil. But our common rat harbours a hæmogregarine whose life-history happens to have been worked out in considerable detail. It is nothing like that described by Captain Dimond, and its intermediate host is not a louse. It is not even an insect. So far as our knowledge extends it is the exception rather than the rule for a hæmogregarine to have an insect for its invertebrate host.

There is much other matter in Captain Dimond's paper which lays itself open to, and even invites, the most destructive criticism. I will not, however, further trespass upon your space. My sole object in writing this letter is to call attention to the extremely debatable character of the "hæmogregarine of trench fever." I cannot but regard it as a duty to the unfortunate sufferers from this affliction to express my misgivings, as a protozoologist, to those members of the medical profession who have a practical interest in the subject but who are unversed in our science. It is with considerable apprehension that I contemplate the possibility of future investigators exploring the lungs, livers, spleens, and other organs of sick soldiers in the hunt for a "hæmogregarine" whose very existence I can only regard as highly hypothetic. I do not deny that Captain Dimond *may* have discovered the parasite which causes trench fever. At present I cannot discover what he has discovered in the way of parasites. But I will venture to predict, Sir, that when you stated in your leading article that "the broad facts of the life-cycle of the parasite appear to be established" you expressed an opinion to which no competent protozoologist will subscribe.

I am, Sir, yours faithfully,

CLIFFORD DOBELL.

Imperial College of Science, Sept. 17th, 1917.

THE LUMLEIAN LECTURES AND MEDICAL RESEARCH.

To the Editor of THE LANCET.

SIR,—Some of us have watched with breathless interest the great struggle of the cardiologists in your columns conducted under the heading, "The Lumleian Lectures and Medical Research." The origin of the struggle was humorous. Dr. F. Smith, in a pungent but rather true letter, pointed out that if we labour the obvious enough we shall make a new discovery of its obviousness, and I was guilty in the next week of pointing out that the English study of heart disease was, if judged by the lectures, already out of date. Then the "new" school, as led by their formidable and renowned chief, created a dramatic surprise by disclosing a grievous lack of knowledge of the literature of the most important cause of heart disease; and finally the two schools approached one another much as did the famous Mac's of music-hall fame—with sweet words, gradually changing towards fierce blows.

It is now, I think, a suitable time for the medical profession to join the new school I have been advocating. As I write this I have before me a special number of *American Medicine* for June, 1915, in which by invitation I wrote an article on the prevention of rheumatism and heart disease. I have also the second annual report of the "Winifred Masterson Burke Relief Foundation," New York, in which institution the suggestions I put forward are being put into practice with most encouraging results. Let me state explicitly that I do not pretend that my article was responsible for this forward step, but, taken with the recent work on rheumatism, I, with others, may justly claim to have lent such an enterprise reasonable scientific support.

Two years after this article the enterprise is in full activity in America. Nearly 20 years after acute rheumatism was shown in this country to be an infection no such effort has been attempted. We are still worrying about mitral stenosis and digitalis, and think that hospitals can alone deal with the problems of heart disease.

Let us now think of the service that institution has already done to practical medicine, and mourn over the wordy controversies upon academic details that have marred our English medical literature.—I am, Sir, yours faithfully,

Sept. 12th, 1917. F. JOHN POYNTON.

BREAST-FEEDING AND THE NERVOUS INFANT.

To the Editor of THE LANCET.

SIR,—I am probably not alone in having felt puzzled by the explanation, recently offered by Dr. H. C. Cameron in your columns,[1] of a certain form of restless behaviour in infants. For it is a startling suggestion that a baby is not uncommonly so baffled by being called upon to take up extra-uterine existence that it loses its head and makes a complete hash of the whole business of feeding. This is neuropathic inheritance with a vengeance!

There can be no question that in this article, as in all his writings on the subject of childhood, Dr. Cameron has drawn an essentially accurate clinical picture. But in attributing its cause to the child's endowment with an unstable nervous disposition he has, I believe, disregarded certain factors which need consideration. There are, at any rate, other things capable of producing something resembling very closely the state of affairs to which he is calling attention.

For example, in any investigation into the causes of restlessness, crying, and reluctance to feed, which may be marked for several days after birth, it is necessary to take into account the variable effect on the child's brain of the stress of labour. Signs of pressure on the head are commonly seen in the form of œdema of the scalp, moulding of the skull, and subperiosteal extravasation of blood. Not very rarely death may precede or quickly follow delivery from intracranial venous laceration, without any sign of outward violence. From a consideration of these facts it would seem reasonable to suppose we must expect considerable difference in the initial behaviour of infants corresponding to the ease or difficulty of their journey through the pelvis. I have certainly regarded the symptoms of several babies which corresponded closely to Dr. Cameron's description as explained in this way, and have used sedatives with apparent benefit. In one such case a midwife told me she believed that the infant "had a bad headache," so clearly did it display a dislike to light or movement. Her diagnosis was probably accurate enough; and for such a child it would clearly be wise to adopt the line of treatment suggested. "A half-darkened room," "absolute quiet," and "gentle handling" form wise advice, though I believe attempts at feeding may largely be left in abeyance until the condition passes off. Chloral will be beneficial in lessening cerebral irritability. But one would suppose that had it to overcome anything so formidable as a precocious display of neurotic instability, its administration would have to be prolonged very considerably.

Whether the explanation here offered for some cases is right or not, it cannot, of course, apply to instances where the child's behaviour is normal at the start and unrest supervenes later. But, again, there are causes of some importance which need to be eliminated before it is wise to conclude that the infant is "neurotic" or its cry "hysterical." Dr. Cameron's statement that the mother's rôle in establishing successful breast-feeding is confined to the possession of an adequately-shaped nipple, is not very helpful. It omits altogether the important provision that the milk which leaves the nipple must be of a kind which will not disturb the baby. Normally, of course, it is perfectly innocuous. But there can be no question that it may in certain circumstances be so unsuitable as to produce pain, vomiting, a refusal to feed, and all the symptoms of unrest which he discusses.

The common fear of nursing women to include this or that article of food in their diet is not entirely without a basis of reason. But any disturbance resulting from indiscretions of food is trivial when compared with the effects of drastic purgation to which many are accustomed to resort and which is still, perhaps, the most rigid feature of obstetrical ritual. The woman is lucky who escapes such purgation during labour; she catches it almost invariably throughout the puerperium. Paradoxically enough the intestinal fatigue, the flatulence, headache, and general misery thus produced are labelled "constipation," and as a daily action of some kind is insisted upon enemata of large volume are commonly added. Nowhere are enema rashes to be seen with such frequency as in maternity hospitals, and the teaching on this point is dogmatic, stern, and impressive. When the toxæmia which must accompany such a state be considered, it is not surprising that the infant is disturbed. The midwife or physician in attendance on nursing women has only to be sufficiently enthusiastic about the need to keep the bowels open, and one can guarantee with a very fair degree of safety the baby before long will "almost jump out of her arms." One can understand its fear of the breast milk; even its cautious distrust of the bottle until the contents have been proved harmless. One cannot grudge it any relief to be gleaned from a few doses of chloral hydrate. But to attribute the dyspepsia as due primarily to an inherited nervous instability would be distinctly unjust to the baby. It would, moreover, render the chance of successful breast-feeding remote, and leave the cause of its failure undetected.

In THE LANCET of Nov. 4th, 1916, I described another common pathological condition of the mother which is certainly productive of unrest in the infant. Disease in connexion with the teeth, whether or not responsible for obvious maternal ill-health, frequently reacts on the child in a manner perhaps comparable to the effect produced by purgatives. In outlining certain features of the behaviour of babies thus affected, I referred to their tendency to be of poor physique, to their refusal to feed, and to the vomiting "of an intractable type, variable from day to day, sometimes interrupting the feed, sometimes following soon after its conclusion; at others interfering with sleep and accompanied by attacks of screaming which may last for hours. The vomiting has a tendency to be frequent, copious, and forcible, and the woman rightly concludes that her milk disagrees with the baby." Though somewhat more emphasis is there laid on the vomiting, the account tallies sufficiently with Dr. Cameron's to make me wonder whether dental disease or some other source of toxæmia in the mother may account for some of "thin, meagre" children he describes.

In bringing forward these causes of disturbance which lead commonly to a failure of breast-nursing, I do not wish to imply that all children are endowed at birth with an equally placid temperament, but rather to emphasise the need for care lest one include in the class of case Dr. Cameron has described conditions which have a quite different etiology, and which demand in consequence investigation along quite different lines.—I am, Sir, yours faithfully,

Gray's Inn, W.C., Sept. 9th, 1917. HAROLD WALLER.

[1] THE LANCET, 1917, ii., 345.

PSYCHIATRY IN ENGLAND.

To the Editor of THE LANCET.

SIR,—In answer to Dr. H. de M. Alexander, I admit the methods of the English Commissioners in Lunacy *re* recovery rate may have their faults, but for comparison's sake it suffices to know that they themselves are far from being content with (what I still call) "the lamentable fact" that recovery rate in asylums has not increased in spite of all that has so far been done. I believe I am right in saying that the Scottish Board of Commissioners admit the same fact, without giving any definite cause for this reproach to psychiatry and to the laws which have in England hindered the early treatment in proper environment of mental disease.

As to the ages of patients admitted I maintain that if cases are taken in hand promptly and the patients are studied clinically in all aspects, the best arrangements being made for treatment and environment, we get many recoveries in quite elderly people.

I am delighted that Dr. Alexander feels himself justified in stating: "There must be few, if any, asylums in which the want of proper departmentisation of cases occurs." I wish he would in confidence give me the names of English asylums, public and private, in which he knows that this practice is carried out to the extent I consider is necessary. Dr. Alexander's quotation from a work of my valued friend the late Sir Thomas Clouston is a very true one; but may I remind Dr. Alexander that that splendid clinical student of mental diseases has made many statements in his numerous books in accordance with my expressed views and experience?

The law of lunacy as carried out in England differs to a great extent from that of Scotland, which allows much more scope for early treatment, either in proper homes or in asylums. So far we have tried in vain to get our lunacy laws altered in this direction, and it has been very disheartening work to sit on committees with this object and with no result, as I well know to my cost.

I am, Sir, yours faithfully,

Bournemouth, Sept. 16th, 1917. L. A. WEATHERLY, M.D.

BRITISH HEALTH RESORTS.

To the Editor of THE LANCET.

SIR,—I was asked some time ago to prepare for Messrs. A. and C. Black a guide to British health resorts, endeavouring, as far as possible, to bring into prominence the many attractions which our own country offers in the way of first-class spas and seaside resorts. Apart from the well-known spas, however, there are many wells and springs scattered through the country which have at least a local repute and are of some historic interest.

I shall be very grateful to any members of the profession or others who will kindly send me details of any such wells, &c., in their district, so that the chapter it is proposed to include on this subject may be as complete and informative as possible. All our big spas had small beginnings, and who knows some of these at present neglected sources of mineralised water may be of value and blossom out into health resorts? It is, at any rate, believed and hoped that once the war is over most people will think twice before taking a journey to Germany and leaving money, which could with equal benefit and greater propriety be spent at home, in the blood-stained hands of the Teuton.

No one who was caught napping at Nauheim, Homburg, Kissingen, or Wiesbaden, at the end of July, 1914, will willingly enter Germany again in search of health. That is pretty certain.—I am, Sir, yours faithfully,

T. D. LUKE, M.D. R.U.I.

St. Ronans, Venlaw Brae, Peebles, Sept. 15th, 1917.

THE SERVICES.

ROYAL NAVAL MEDICAL SERVICE.

J. H. M. Sandison to be temporary Surgeon.

ARMY MEDICAL SERVICE.

Col. S. C. Philson is retained on the Active List under the provisions of Arts. 120 and 522, Royal Warrant for Pay and Promotion, and to be Supernumerary.

Col. James C. Morgan, from Half-pay List, retires on retired pay on account of ill-health.

Lieut.-Col. Hubert A. Bray, C.M.G., to be temporary Colonel whilst employed as Assistant Director of Medical Services of a Division.

TERRITORIAL FORCE.

Major (temp. Lieut.-Col.) M. Dunning to be Assistant Director of Medical Services and retain his temporary rank whilst so employed.

ROYAL ARMY MEDICAL CORPS.

The undermentioned are granted temporary rank as stated:—As Lieutenant-Colonel: Lieut.-Col. E. J. Moore, C.B. As Majors: Major C. E. M. Lowe, R.G.A., T.F., and Major C. J. Caddick, R.F.A., T.F. As Captains: Capt. E. P. W. Wedd, Yeo., T.F., and Capt. P. T. Spencer Phillips, R.F.A.

Major B. H. V. Dunbar, D.S.O., to be acting Lieutenant-Colonel whilst holding a special appointment.

Temp. Major J. N. Gunn, Canadian A.M.C., to be acting Lieutenant-Colonel while commanding Canadian Field Ambulance.

Temp. Major E. F. Eliot relinquishes the acting rank of Lieutenant-Colonel on reposting.

F. Lessore, C.A.M.C., to be temporary Honorary Major without pay and allowances.

Temp. Capt. G. M. Davis to be temporary Major.

Temp. Capt. B. L. Neiley, Canadian Army Dental Corps, to be temporary Major.

To be temporary Captains: W. C. Stevenson (Home Hospital Reserves), R.C. Mullins (S.A. Medical Corps), R. D. Kidd (S.A. Medical Corps), H. Symonds (S.A. Medical Corps), W. Smith (S.A. Medical Corps).

C. A. Moseley (British West Indies Regiment) to be Surgeon-Captain.

Temporary Lieutenants to be temporary Captains: G. H. Stobie, A. Levesque, C. K. Church.

To be temporary Honorary Lieutenants: C. C. Allen, J. H. Dorman.

Officers relinquishing their commissions: Temp. Hon. Capt. F. Fraser, Temp. Hon. Capt. K. M. Walker, Temp. Hon. Lieut. J. R. Dick, and Temp. Hon. Lieut. F. F. Young, having ceased to be employed with No. 1 British Red Cross Hospital; Surg.-Capt. C. A. Moseley (British West Indies Regiment), Temp. Capts. G. W. Anderson and E. R. Grieveson, Temp. Lieuts. E. W. Squire, J. Harper (on account of ill-health), C. T. Darwent (on account of ill-health), J. C. Auchencloss (on account of ill-health).

SPECIAL RESERVE OF OFFICERS.

Major H. G. Smeeth to be acting Lieutenant-Colonel whilst in command of a Field Ambulance.

To be Lieutenants: H. D. Apergis, J. L. Rowlands, D. J. Mackinnon, and J. Joels (from Glasgow University Contingent, O.T.C.); F. E. Bendix (from University of London Contingent, O.T.C.); H. Taylor and H. G. Morris-Jones (from Manchester University Contingent, O.T.C.); F. M. H. Sanderson, H. B. Renton, G. L. Malcolm-Smith, and F. Jones (from Edinburgh University Contingent, O.T.C.); C. Reid (from Aberdeen University Contingent, O.T.C.); C. Wood.

TERRITORIAL FORCE.

Major (acting Lieut.-Col.) A. D. Ducat to be Major and to retain the acting rank of Lieutenant-Colonel.

Major (temp. Lieut.-Col.) M. Dunning is restored to the establishment and retains his temporary rank on vacating an appointment as Assistant Director of Medical Services.

Capt. (acting Lieut.-Col.) L. A. Dingley relinquishes his acting rank on ceasing to command a Field Ambulance.

Capt. A. Baxter to be acting Lieutenant-Colonel whilst commanding a Field Ambulance.

Capts. G. P. Chappel and W. G. Mitchell to be Majors.

Capt. G. H. Cowen is seconded for duty with War Hospital.

Capt. J. S. Arthur, from Unattached List, to be Captain.

Lieut. W. E. Smith to be Captain.

T. H. Savory, from Norfolk Regiment, to be Lieutenant.

C. H. Gibb to be Lieutenant.

Capt. F. A. J. Mayes relinquishes his commission on account of ill-health contracted on active service and is granted the honorary rank of Captain.

DEATHS IN THE SERVICES.

Surg.-Gen. William Simson Pratt, C.B., R.A.M.C. (retired), at Bideford, on Sept. 8th, aged 68. Formerly he was Principal Medical Officer in the Southern Command, and in 1900 he was appointed Principal Medical Officer at Gibraltar. For his services in the Nile Expedition in 1884–85 he was mentioned in despatches and promoted Surgeon-Major. He reached the rank of Lieutenant-Colonel in 1893 and of Colonel in 1902.

Obituary.

FREDERIC WILLIAM KIDD, M.D. DUB., L.R.C.P. & S.I.,

PROFESSOR OF MIDWIFERY AT THE ROYAL COLLEGE OF SURGEONS IN IRELAND; EX-MASTER OF, AND CONSULTING SURGEON TO, THE COOMBE LYING-IN HOSPITAL; AND GYNÆCOLOGIST TO THE MEATH HOSPITAL.

WE announced last week the sudden death of Dr. Frederic William Kidd, which took place at his residence in Dublin on Sept. 5th. He received his medical education at Trinity College and in the Carmichael School, Dublin. Obtaining an arts degree in 1880, he qualified in the following year by taking the L.R.C.S. Irel., graduating M.D. at the University of Dublin six years later. Subsequently he took the Licentiateship of the Royal College of Physicians of Ireland. In 1884 he was elected a Fellow of the Royal Academy of Medicine in Ireland, served on the council as an honorary member, and was President of the Obstetrical Section. His many other appointments included those of examiner in gynæcology at the Royal College of Surgeons in Ireland and examiner in midwifery at the University of Dublin. He was also a Past-President of the Irish Medical Association and an ex-member of the council of the British Gynæcological Society.

Dr. Kidd held a position of great respect among his colleagues, and in both clinical and academic circles his loss will be much felt, for the post of visiting gynæcologist to the Meath Hospital and County Dublin Infirmary and the chair of midwifery in the schools of surgery have been vacated by his death, after many years of able and untiring service. He was a frequent contributor to the Transactions of the Royal Academy of Medicine in Ireland in the departments of his profession in which he was interested.

Many years ago Dr. Kidd was a well-known Rugby footballer, and as a member of Lansdowne Club he gained his International cap and played *v.* Scotland at Belfast in 1877 and *v.* England at Dublin in 1878. He leaves four sons, all of whom are serving with His Majesty's Forces. His kindly personality and the unfailing interest he took in the welfare of his students gained for him a wide circle of friends, to whom the news of his death has come with a sense of personal loss.

THE LATE DR. JOHN ROBERTS THOMSON, V.D.—Dr. Thomson, who died at his residence, Monkchester, Bournemouth, at the age of 73, on Sept. 11th, was educated at Edinburgh University, and qualified in 1865 by taking the Licentiateship of the Royal College of Surgeons of Edinburgh. A year later he graduated M.D. of Edinburgh University, and subsequently, in 1880, became a Fellow of the Royal College of Physicians of London. He was consulting physician to the Royal Victoria and West Hants Hospital, Bournemouth, the Firs Home for Consumption, and the Royal National Sanatorium for Consumption and Diseases of the Chest. He was a Vice-President of the British Medical Association, having been President in 1891, when the Association held its annual meeting at Bournemouth, and President of Council. Dr. Thomson was a justice of the peace for Hants and the borough of Bournemouth and an alderman of the Hants county council.

Dr. Christoph Socin, assistant at the Basle Institute of Pathology, has been appointed professor of pathological anatomy and director of the Pathological Institute at Lausanne.

The War.

THE CASUALTY LIST.

THE following names of medical officers appear among the casualties announced since our last issue :—

Killed.

Lieut. A. G. Dunn, R.A.M.C., received his medical education at Newcastle-on-Tyne, and qualified in 1903. Prior to joining up he was in practice at Newcastle-on-Tyne, and held an appointment at the Royal Victoria Infirmary in that city.

Died of Wounds.

Capt. B. Woodhouse, R.A.M.C., received his medical education at University College Hospital, London, and qualified in 1913. He joined the R.A.M.C. shortly afterwards, and was promoted Captain in March, 1915.

Wounded.

Capt. A. L. Anthony, R.A.M.C., attached Royal Warwick Regiment.
Capt. N. J. H. Gavin, M.C., R.A.M.C.
Capt. J. S. Taylor, R.A.M.C., attached Rifle Brigade.
Capt. R. W. Hodgson-Jones, R.A.M.C.
Lieut. W. G. McConnell, R.A.M.C., attached Yorks. and Lancs. Regiment.
Lieut.-Col. J. Barkley, R.A.M.C.
Capt. W. C. D. Maile, R.A.M.C.
Capt. A. H. Falkner, R.A.M.C., attached Royal Lancs. Regiment.
Capt. L. J. Moir, R.A.M.C.
Capt. G. W. Stanley, R.A.M.C.
Capt. P. A. Doyle, R.A.M.C.
Lieut. M. J. Macauley, R.A.M.C.
Capt. L. R. Shore, M.C., R.A.M.C.
Capt. L. M. Weeks, R.A.M.C.
Capt. W. L. R. Wood, M.C., R.A.M.C., attached Royal Field Artillery.
Lieut. H. Snape, R.A.M.C.
Capt. T. H. Whittington, R.A.M.C., attached Essex Regt.
Lieut.-Col. H. Gibson, R.A.M.C.
Capt. J. Lyons, R.A.M.C.
Capt. H. Moore, M.C., R.A.M.C.
Capt. J. F. W. Sandison, R.A.M.C.

CASUALTIES AMONG THE SONS OF MEDICAL MEN.

The following additional casualty among the sons of medical men is reported :—

Major H. S. Semple, M.C., Royal Engineers, killed in action, eldest son of Dr. H. F. Semple, of Budleigh Salterton, Devon.

THE HONOURS LIST.

Clasp to the Victoria Cross.

The highest award for bravery and devotion to duty in the face of the enemy has again been bestowed upon a member of the medical profession, Captain N. G. Chavasse, who has, most regretfully be it recorded, paid the supreme sacrifice. The official announcement is as follows :—

Capt. Noel Godfrey Chavasse, V.C., M.C., late R.A.M.C., attached Liverpool Regiment.

For most conspicuous bravery and devotion to duty when in action. Though severely wounded early in the action whilst carrying a wounded soldier to the dressing station, Captain Chavasse refused, to leave his post, and for two days not only continued to perform his duties, but in addition went out repeatedly under heavy fire to search for and attend to the wounded who were lying out. During these searches, although practically without food during this period, worn with fatigue and faint with his wound, he assisted to carry in a number of badly wounded men over heavy and difficult ground. By his extraordinary energy and inspiring example he was instrumental in rescuing many wounded who would have otherwise undoubtedly succumbed under the bad weather conditions. This devoted and gallant officer subsequently died of his wounds.

Captain Chavasse was the younger of the twin sons of the Lord Bishop of Liverpool, and was educated at Liverpool College and at Oxford, qualifying in 1912. His death from wounds was recorded in THE LANCET of August 18th (p. 259), whilst the awards of the M.C. and of the V.C. were recorded in our issues respectively of Jan. 22nd, 1916 (p. 215), and of Nov. 4th, 1916 (p. 806).

The following promotions of and awards to medical officers are also announced :—

To be Brevet-Lieutenant-Colonel.

Major (temp. Lieut.-Col.) R. M. Carter, I.M.S.

Distinguished Service Order.

Temp. Capt. Lewis Anderson, R.A.M.C.

For conspicuous gallantry and devotion to duty. He carried out his duties for 48 hours without relief, attending to over 100 cases and working under the most adverse conditions. He was exposed throughout to intense and heavy fire of shell and gas shells, which rendered it necessary for him to work in a mask. The following night, after his battalion had been withdrawn, he returned to search for wounded in the front line, which was still in close contact with the enemy, and after working for several hours under heavy shell-fire he collected and evacuated all his wounded, having displayed magnificent devotion and the utmost contempt for danger throughout.

Capt. (Temp. Lieut.-Col.) Norman Cecil Rutherford, R.A.M.C.

For conspicuous gallantry and devotion to duty when in charge of an advanced dressing station. He worked continuously under heavy shell-fire, evacuating the wounded from the forward area, and it was owing to his splendid example of devotion that the work was efficiently carried out.

Major Robert Archer Lloyd, I.M.S.

Lieut. (temp. Capt.) Arthur Frederick Isbell Patterson, R.A.M.C.

Military Cross.

Capt. John Ernest Affleck, Canadian A.M.C.

For conspicuous gallantry and devotion to duty. He crawled along a shallow and much-exposed trench to rescue a very severely wounded officer, whose life depended upon an immediate operation. With the assistance of a stretcher-bearer he managed to get the wounded man out on a blanket to a place where he could be evacuated. The task was a very slow and dangerous one, by reason of their being completely exposed to enemy snipers, but Capt. Affleck did not hesitate to risk his life in order to do all that was humanly possible for this wounded officer.

Capt. John Arthur Bell, R.A.M.C.

For conspicuous gallantry and devotion to duty during a heavy bombardment. He proceeded along a road which was exposed to the most intense shell-fire in order to attend to four wounded officers. He dressed their wounds and remained with them until they were evacuated by motor ambulance, which was only accomplished with the greatest difficulty owing to the heavy shelling. His absolute disregard of danger and devotion to duty amidst terrific shell-fire were exceptionally splendid and beyond all praise.

Capt. John Bernard Cavenagh, R.A.M.C., Spec. Res.

For conspicuous gallantry and devotion to duty when in charge of bearers. He exposed himself to shell fire for 48 hours with splendid fearlessness, keeping all the time in touch with aid-posts in the captured line, thereby ensuring a rapid evacuation of the wounded.

Capt. Clarence Hamul Denyer, R.A.M.C.

For conspicuous gallantry and devotion to duty when in command of divisional bearers. It was due to his fearless and capable handling of his party that the evacuation of the wounded was carried out with rapidity and success.

Temp. Capt. Charles Dickson, R.A.M.C.

For conspicuous gallantry and devotion to duty when in charge of an advanced dressing station. Under an intense high-explosive and gas shell bombardment the building was partially wrecked, and the patients were in danger of death from gas-poisoning. He at once personally organised a working party to replace the anti-gas screens and take other precautions for the safety of the wounded; this necessitated working in the open under extremely heavy fire, during which his total disregard of safety set a most inspiring example to his men. By his energy and devotion the lives of many badly wounded men were saved.

Temp. Capt. Charles Dundee, R.A.M.C.

For conspicuous gallantry and devotion to duty. He worked for three days, bandaging the wounded under fire, and successfully evacuating every case in his battalion almost as soon as they occurred. Over 500 cases passed through his hands, and he displayed a splendid spirit of energy and devotion.

Temp. Lieut. David Hammond Fraser, R.A.M.C.

For conspicuous gallantry and devotion to duty. Whilst his battery was under very heavy gas bombardment a shell wrecked the officers' mess dug-out and buried two officers and five men. Lieut. Fraser, helped by a corporal, most gallantly assisted to rescue the buried men and restore respiration, entering the dug-out several times, until he eventually collapsed from the gas. On recovering consciousness he again attempted to enter the dug-out, but was prevented from doing so. Later he collapsed again and remained unconscious for a long time. It was due to his promptness and energy that no more than two of the gassed men succumbed.

Temp. Capt. Augustus Joseph Hickey, R.A.M.C.

For conspicuous gallantry and devotion to duty when in command of an advanced dressing station. He worked with the utmost energy and disregard of danger for 48 hours under shell-fire, during which time he passed through more than 700 wounded. His skill and devotion saved many lives.

Temp. Capt. William Bird Loveless, R.A.M.C.

For conspicuous gallantry and devotion to duty in tending the wounded under heavy shell-fire. Although wounded in the face early in the day he did not leave his post, but continued with his work until he came out of action with his battalion, displaying splendid keenness and devotion to duty.

Temp. Capt. Anthony John McCreadie, R.A.M.C.

For conspicuous gallantry and devotion to duty under heavy shell-fire and in most trying circumstances. He worked alone and incessantly for 36 hours in the open attending to the wounded, and on two occasions he carried men under cover and dressed them. He evacuated all the wounded with admirable rapidity and efficiency, and his coolness and disregard for personal safety under fire afforded a magnificent example to all ranks. He has displayed similar gallantry on other occasions.

Capt. John Morrison Milne, R.A.M.C.

For conspicuous gallantry and devotion to duty. When a dug-out containing combustion products was blown in and the inmates buried he procured oxygen cylinders and played them into the dug-out, thereby saving their lives. He also assisted most untiringly in digging out the men, who owe their lives to his promptness and gallantry under heavy shell fire.

Temp. Capt. Samuel Ernest Picken, R.A.M.C.

For conspicuous gallantry and devotion to duty in going forward under heavy shell-fire and attending to the wounded in advanced trenches and shell-holes. He remained in the shelled area for a long period, working incessantly and efficiently at the dressing and evacuation of the wounded. He has always shown the same gallant spirit and devotion to duty.

Capt. James Calvert Spence, R.A.M.C., Spec. Res.

For conspicuous gallantry and devotion to duty in proceeding to a battery that was suffering heavily from intense enemy shell-fire, and continuing to search blown-in dug-outs and tend the wounded under heavy fire. He displayed exceptional coolness and gallantry on this occasion, and on many previous occasions he has carried out his duties with magnificent devotion.

Temp. Capt. Hugh Frederic Wickens, R.A.M.C.

For conspicuous gallantry and devotion to duty in attending to the wounded whilst the camp was being heavily shelled. The dressing station was totally unprotected, and when it was eventually destroyed by enemy shell-fire he showed splendid initiative and coolness in re-establishing his station elsewhere, continuing to clear the wounded and do his work in the most gallant and devoted manner. He has on several previous occasions displayed conduct of the same high order.

The names of the following medical officers have been brought to the notice of the Secretary of State for War for valuable services rendered in connexion with military operations in the field :—

Capt. W. H. Marshall, M.C., R.A.M.C.; Maj. W. McConaghy, R.A.M.C.

And the names of the following for valuable medical services rendered in connexion with the war, including certain officers engaged in medical work, though not members actually of the profession :—

Col. G. G. Adams; Temp. Maj. T. S. Allan; Temp. Qrmr. and Hon. Lt. T. Allen; Maj. W. E. A. Armstrong, I.M.S.; Maj. J. A. Anderson; Maj. R. Y. Anderson; Lt.-Col. F. H. Appleby; Capt. T. Armour.

Capt. W. G. Ball; Temp. Lt.-Col. G. A. Bannatyne; Capt. A. S. Barnes; Lt.-Col. Sir J. Barr; Qrmr. and Hon. Maj. J. H. W. Beach; Lt.-Col. F. W. Begbie; Lt.-Col. J. R. Benson; Maj. R. A. Bickersteth; Surg.-Gen. W. G. Birrell; Col. L. J. Blandford; Temp. Capt. J. Bowes; Capt. E. C. Bradford; Qrmr. and Hon. Maj. T. F. Brake, ret. pay; Maj. C. Bramhall; Lt. Col. H. Bramwell; Maj. H. A. Bransbury; Temp. Capt. C. W. J. Brasher; Lt.-Col. G. A. T. Bray; Temp. Capt. R. H. Bremridge; Capt. E. A. P. Brock; Temp. Capt. F. W. Broderick; Lt.-Col. J. F. Brodie; Qrmr. and Hon. Capt. F. Bruce, ret. pay; Temp. Maj. H. W. Bruce; Lt.-Col. H. E. Bruce-Porter; Temp. Capt. R. Buchanan; Lt.-Col. G. H. Bull, I.M.S., ret. pay; Col. W. H. Bull; Temp. Lt.-Col. D. Buncombe; Col. P. C. Burgess; Temp. Capt. J. Burnford; Col. E. Butt; Temp. Lt.-Col. J. B. Byles.

Col. R. Caldwell; Capt. F. G. Caley; Lt. Col. E. M. Callender; Temp. Capt. W. K. Carew; Temp. Lt.-Col. A. Carless; Temp. Capt. J. E. Carruthers; Lt.-Col. W. P. Carson, I.M.S.; Temp. Lt.-Col. A. H. Carter; Lt.-Col. C. W. Cathcart; Hon. Temp. Lt.-Col. H. Chaffer; Maj. A. J. Chambers, ret. pay; Temp. Capt. E. Chambers; Lt.-Col. J. Clayton-White, I.M.S.; Col. Sir J. R. A. Clark; Lt.-Col. T. H. M. Clarke; Lt.-Col. T. H. F. Clarkson; Lt.-Col. G. J. Coates; Col. W. Coates, C.B.; Lt.-Col. M. A. T. Collie, I.M.S.; Temp. Capt. A. Compton; Col. B. B. Connolly, C.B., ret. pay; Temp. Lt.-Col. H. G. Cook; Lt.-Col. M. P. Corkery; Capt. E. M. Corner; Temp. Capt. W. B. Cosens; Lt.-Col. R. Cottell; Capt. L. Courtauld; Lt. T. Croft; Col. A. E. J. Croly; Lt.-Col. Sir W. R. Crook-Lawless; Maj. H. A. Cummins; Maj. E. N. Cunliffe; Lt.-Col. R. O. Cusack, ret. pay.

Col. J. H. Daly; Temp. Maj. W. R. Dawson; Capt. C. S. Deane; Temp. Capt. S. H. Denyer; Temp. Capt. J. R. Dickson; Temp. Maj. C. B. Dobell; Temp. Capt. H. L. Dobson; Col. J. R. Dodd, ret. pay; Temp. Lt.-Col. A. P. Dodds-Parker; Capt. G. H. Dominy; Capt. J. S. C. Douglas; Lt.-Col. V. G. Drake-Brockman, I.M.S.; Temp. Capt. J. D. Duncan.

Surg.-Gen. J. D. Edge, C.B.; Lt.-Col. C. W. Edwards; Lt.-Col. F. W. Ellis.

Lt.-Col. N. Falchnie; Temp. Capt. N. M. Falkiner; Maj. A. C. Farquharson; Lt.-Col. Sir J. Fayrer; Temp. Capt. W. Fell; Maj. E. G. Firench; Capt. G. L. Findlay; Temp. Capt. W. T. Finlayson; Capt. N. S. Finzi; Col. H. H. Forman; Temp. Capt. A. A. Forty.

Temp. Lt.-Col. T. H. Gibbon; Qrmr. and Hon. Lt. T. Gibbs; Capt. W. Gibbs-Lloyd; Qrmr. and Hon. Maj. J. Gillman; Capt. E. E. Glynn; Lt.-Col. G. M. Goldsmith; Temp. Lt.-Col. E. Goodall; Capt. G. W. Goodhart; Surg.-Maj. J. F. Gordon Dill; Maj. A. M. Gossage; Capt. A. H. Gosse; Maj. D. J. Graham; Maj. E. Gray; Maj. T. W. Griffith; Temp. Capt. A. Griffiths; Col. J. Griffiths; Temp. Capt. W. Griffiths; Surg. Gen. Sir W. L. Gubbins, K.C.B., M.V.O.

Col. R. I. D. Hackett; Temp. Maj. J. H. Hall-Edwards; Lt.-Col. R. H. Hall; Temp. Qrmr. and Hon. Lt. A. E. Hanrahan; Lt.-Col. T. W. O. H. Hamilton; Temp. Maj. L. C. V. Hardwicke; Lt.-Col. L. W. Harrison; Maj. G. P. D. Hawker; Capt. F. S. Hawks; Qrmr. and Hon. Capt. R. Hawkey, ret. pay; Qrmr. and Hon. Lt. C. Hayward; Lt.-Col. M. L. Hearn, ret. pay; Temp. Capt. J. P. Helliwell; Maj. R. W. W. Henry; Temp. Capt. S. L. Hinde; Temp. Capt. A. C. Holden; Maj. W. A. L. Holland; Maj. C. H. Hopkins; Capt. T. J. Horder; Col. S. S. Hoyland; Temp. Maj. D. W. Hume; Temp. Maj. A. M. Humphrey; Capt. F. H. Humphries.

Lt.-Col. F. S. Irvine.

Temp. Capt. A. L. Jackson; Lt.-Col. C. James; Hon. Surg.-Col. W. C. James; Lt.-Col. J. B. Jameson, I.M.S.; Temp. Capt. W. W. Jameson; Maj. J. K. Jamieson; Qrmr. and Hon. Lt. E. Janes; Col. R. Jennings; Qrmr. and Hon. Maj. H. J. Johnson; Lt.-Col. P. H. Johnston; Temp. Capt. I. Jones; Capt. A. A. Jubb.

Temp. Lt.-Col. J. Keay; Temp. Qrmr. and Hon. Lt. C. R. W. Keefe; Temp. Col. F. Kelly; Temp. Capt. A. M. Kennedy; Temp. Lt.-Col. H. A. Kidd; Maj. W. Kirkpatrick.

Temp. Capt. A. B. Laidlaw; Temp. Capt. H. C. T. Langdon; Temp. Maj. J. S. Law; Temp. Maj. J. R. Lee; Surg.-Gen. O. E. P. Lloyd, V.C., C.B., ret. pay; Qrmr. and Hon. Maj. H. Lockhart; Temp. Lt.-Col. J. R. Lord; Col. T. J. R. Lucas, C.B., ret. pay; Temp. Capt. A. Lundie; Lt.-Col. A. A. Lyle, ret. pay; Maj. J. P. Lynch.

Surg.-Maj. F. F. MacCabe, Spec. Res.; Temp. Maj. D. K. MacDowell; Maj. W. G. Macfee; Temp. Maj. C. V. MacKay; Lt.-Col. A. W. MacKintosh; Temp. Capt. P. W. Maclagan; Temp. Capt. J. M. MacMillan; Maj. J. N. Macmullan; Temp. Maj. H. G. Magrath; Lt.-Col. J. R. Mallins; Capt. W. Martin; Temp. Maj. H. C. Marr; Qrmr. and Hon. Capt. J. Mathews; Qrmr. and Hon. Lt. L. Matthews; Col. W. A. May, C.B.; Temp. Capt. J. T. McCullagh; Col. C. H. Melville; Maj. A. A. W. Merrick; Lt.-Col. J. Mill; Lt.-Col. L. A. Mitchell; Lt.-Col. J. M. Moir; Lt.-Col A. H. Morris; Temp. Maj. J. S. Morrow; Lt.-Col. R. E. R. Morse; Temp. Lt.-Col. S. Mort; Temp. Capt. L. W. Mortimer; Maj. F. W. Mott; Lt.-Col. C. W. M. Moullin; Maj. A. Mowat; Temp. Lt.-Col. Sir B. G. A. Moynihan, C.B.; Temp. Capt. G. Muir; Capt. H. L. Munro; Temp. Capt. C. E. Murphy; Lt.-Col. Sir S. F. Murphy.

Temp. Maj. E. H. T. Nash; Col. L. T. M. Nash; Temp. Maj. A. Neve; Col. F. P. Nichol; Temp. Maj. C. Noon.

Temp. Qrmr. and Hon. Lt. J. Ogden; Col. C. P. Oliver; Temp. Capt. N. H. Oliver; Temp. Capt. J. F. O'Malley; Temp. Maj. L. Owen.

Lt.-Col. H. K. Palmer; Lt.-Col. Sir A. Pearce-Gould; Temp. Capt. R. E. F. M. Pearse; Temp. Capt. J. H. Peek; Capt. C. E. Petley; Temp. Capt. A. Phillips; Lt. Col. E. V. A. Phipps; Temp. Lt. A. C. Pickett; Bt. Col. E. M. Pilcher; Qrmr. and Hon. Capt. A. J. Pilgrim; Capt. H. Pinto-Leite; Lt.-Col. D'A. Power; Temp. Lt.-Col. W. T. Prout; Temp. Maj. F. C. Purser.

Col. W. J. R. Rainsford, ret. pay; Capt. C. F. Read; Lt.-Col. W. L. Read; Lt.-Col. E. S. Reynolds; Temp. Maj. T. B. Rhodes; Temp. Maj. R. G. Riches; Lt.-Col. B. Riddell; Temp. Maj. N. Roberts; Temp. Maj. F. M. Rodgers; Maj. R. C. Rodgers; Hon. Surg.-Col. W. M. Roocroft; Capt. C. H. Rook, Spec. Res.; Temp. Lt.-Col. F. Romer; Qrmr. and Hon. Lt. H. H. Ross; Temp. Capt. J. R. H. Ross; Lt.-Col. C. F. Routh; Lt.-Col. W. Rowney, ret. pay; Temp. Maj. R. G. Rows; Col A. F. Russell, ret. pay; Maj. G. B. Russell.

Lt.-Col. J. V. Salvage; Temp. Capt. C. Samut; Temp. Capt. W. Sansom; Temp. Maj. W. Scatterty; Capt. H. A. Scholberg; Capt. H. R. Sedgwick; Temp. Maj. G. T. S. Siehel; Temp. Lt. Col. A. Simpson; Temp. Maj. G. Simpson; Maj. M. S. Skirving, Aust. A.M.C.; Col. H. M. Sloggett; Lt.-Col. P. C. Smith; Hon. Surg.-Gen. W. R. Smith; Lt.-Col. W. F. Somerville; Maj. C. G. Spencer, ret. pay; Maj. G. H. Spencer; Temp. Capt. W. S. Sprent; Temp. Capt. W. S. Stalker; Maj. H. K. Steele, Spec. Res.; Temp. Capt. L. H. Y. Stephen; Surg.-Gen. W. F. Stevenson, C.B.; Temp. Capt. C. R. Stewart; Temp. Maj. H. J. Stiles; Maj. W. S. V. Stock; Temp. Capt. A. Stodart-Walker; Temp. Capt. F. W. S. Stone; Qrmr. and Hon. Lt. S. Sully; Temp. Capt. R. W. Sutherland; Lt.-Col. M. Swaby; Temp. Capt. B. Sweeten.

Maj. J. Tait; Temp. Maj. J. G. Taylor, Temp. Lt.-Col. W. Taylor; Temp. Lt.-Col. D. G. Thomson; Lt.-Col. H. Thomson, I.M.S.; Lt.-Col. S. J. Thomson, I.M.S.; Surg.-Col. A. Thorne; Lt.-Col. E. N. Thornton, S.A.M.C.; Lt.-Col. J. Tidbury; Maj. H. W. M. Tims; Maj. W. E. F. Tinley; Qrmr. and Hon. Lt. A. G. Tod; Col. O. Todd; Temp. Qrmr. and Hon. Lt. J. Tonkinson; Temp. Maj. F. S. Toogood; Lt.-Col. T. B. A. Tuckey, ret. pay.

Temp. Lt.-Col. W. J. N. Vincent; Maj. C. W. Vining; Capt. S. G. Vintner.

Maj. D. Walker; Temp. Capt. R. R. Wallace; Col. C. A. Webb; Maj. S. G. Webb; Capt. F. J. Wethered; Temp. Hon. Maj. W. I. de C. Wheeler; Surg. Lt.-Col. P. H. Whiston; Qrmr. and Hon. Capt. J. C. B. Whitehorn; Lt.-Col. C. W. H. Whitestone; Temp. Qrmr. and Hon. Lt. L. Whittaker; Qrmr. and Hon. Lt. F. B. Wild; Temp. Capt. G. C. W. Williams; Lt.-Col. S. R. Wills; Lt. Col. A. R. Wilson; Capt. J. A. I. Wilson, Spec. Res.; Temp. Lt. Col. T. B. Winter; Temp. Capt. E. W. Witham; Temp. Qrmr. and Hon. Lt. J. H. Withy; Temp. Maj. J. C. Woods; Temp. Lt.-Col. J. F. Woolyatt; Qrmr. and Hon. Maj. H. Woolley; Temp. Maj. R. Worth; Temp. Lt.-Col. W. Wrangham; Temp. Lt.-Col. G. A. Wright; Maj. W. E. Wynter.

Maj. A. G. Yates; Temp. Maj. C. S. Young; Lt.-Col. G. H. Younge, ret. pay.

MEDICAL BOARDS FOR FUNCTIONAL NERVOUS DISORDERS.

We publish elsewhere an advertisement from the Ministry of Pensions, Westminster House, Millbank, inviting applications from registered medical practitioners in the counties of Westmorland, Lancashire, and Cheshire to serve on medical boards for the examination of, and the assessment of pensions for, men discharged from the Army for neurasthenia and functional nervous disorders. We hope that the medical practitioners who are able to carry on this valuable work—it is suggested that the time required will not exceed five hours per diem—will make their applications promptly, stating the number of days per week on which their services will be available. Our readers will, we know, approve of this sensible manner of obtaining assistance for purposes arising out of the war from medical men still in civilian practice.

THE EMPLOYMENT OF AMERICAN PRACTITIONERS IN MILITARY HOSPITALS.

We noted last week briefly the fact that in certain commands it had been decided to supersede British civilian practitioners serving with the forces by American medical men. In this way more British practitioners would be available to meet the pressing home needs which have been made clear by the work of the Central Medical War Committee. But that committee has received no indication that a general policy of substitution has been prepared by the War Office, and in the absence of any organised plan it is certain that considerable muddle will ensue and justifiable chagrin be caused.

In all areas the American practitioners can be quite certain of finding on the part of their British colleagues a warm welcome. No feelings of resentment aroused by abrupt dismissals can possibly be directed against our professional colleagues and military allies, who for their part can only feel regret, if they find themselves in places where their services are not urgently required, when at other places the reverse position maintains. We presume that the War Office will take counsel with the Central Medical War Committee sooner or later, because that body possesses all the detailed information necessary to say where a shortage of civilian medical practitioners is being felt, and therefore where most valuable relief could be afforded by the drafting into the war hospitals of American practitioners. But it is a pity that some such co-operation between the War Office and the Statutory Professional Committees did not take place before active substitution commenced. Already at several centres civil practitioners, who for small emolument have done first-class work at military hospitals, have been suddenly sent back to their civilian practices, though for the conduct of those practices they had made proper arrangements in their absence, so that the community in which they practised was undergoing the minimum of inconvenience. Naturally this position is deeply felt by those officers, while the unpleasantness could have been avoided by clear information to all concerned on what principle the substitution was being made.

It is clear that the training which they will receive in the war hospitals will be valuable to the American practitioners, but this training might have been secured for them more effectively on some plan of dilution, under which some of those who had been discharging the duties previously would have remained at their places for the assistance of the new men drafted in. According to this plan the reinforcement of the supply of practitioners could and would have been directed to the areas where it was urgently needed. Economy would in this way have been effected by increasing gradually the number of whole-time men; but the services of many of the civilian practitioners who have been working at military hospitals have not been remunerated on such a scale that economy can play any great part in the action so far taken by the War Office. We hope that, before it is too late, the War Office will decide to use the services of American practitioners upon some intelligible principle which will secure for the medical officers of our allies the advantages of proper training, and for this country additional medical service in those areas—all well known to the Central Medical War Committee—where the need is felt.

THE WAR RECORD OF THE LONDON MEDICAL SCHOOLS: THE THIRD YEAR OF WAR.

An inquiry into the war record of the larger metropolitan medical schools a year ago resulted in obtaining some interesting figures which were published in THE LANCET of Sept. 23rd, 1916, p. 579. We are now able to complete some of these figures to include the third year of war, but the records cannot possibly be entirely up to date. The deans of all the schools desire to be kept closely informed of the records of their men who are serving in the Navy and Army. Those schools which have furnished returns are given in alphabetical order:—

St. Bartholomew's.—From Sept. 1st, 1916, to August 25th, 1917, 231 joined the Army and 40 joined the Navy; 12 were killed in action, 7 died on service, 4 were drowned, 4 died of wounds, 33 were wounded, 1 was missing, and 4 were prisoners (of whom 2 have been exchanged). Mentioned in Despatches: Army, 138; Navy, 2. Honours: K.C.M.G., 1; C.B., 5; C.S.I., 1; C.M.G., 6; D.S.O., 12; Bar to Military Cross, 3; Military Cross, 32; D.S.C., 1; Knight of Grace of St. John of Jerusalem, 1; Kaisar-i-Hind Medal, 1; Serbian Order of White Eagle (2nd Class, 1; 4th Class, 1; 5th Class, 4), 6; Legion of Honour, conferred by the French Republic, 2; Order of St. Stanislas (2nd Class), 2; Officer of the Order de la Couronne, conferred by the King of the Belgians, 1; Officer, Military Order of Savoy, conferred by the King of Italy, 1; Promotions for valuable services at home, 12; Territorial Decoration, 2. The completed numbers for the three years are therefore: Joined, 1746. Died on Service, 66.

St. George's.—The completed figures are: Joined, 299. Died on service, 8 (of whom 6 were killed); wounded, 10; Prisoners, 2. Honours: C.M.G., 4; D.S.O., 5; M.C., 6; C.B., 2; Mentioned in Despatches, 40.

King's College.—The completed figures are: Joined, 269. Died, 16. Honours: K.C.B., 1; K.C.M.G., 3; K.C.V.O., 1; C.B., 3; C.M.G., 5; Military Cross, 8; D.S.O., 8; Mentioned in Despatches, 29; Legion of Honour (Grand Officier), 1; Commandeur de l'Ordre de Leopold, 2.

London.—The completed figures are: Joined, 1278. Died, 72. Honours: K.C.B., 1; C.B., 3; C.M.G., 8; D.S.O., 17; Knighthood, 1; D.S.C., 2; Bar to Military Cross, 1; M.C., 59; Military Medal, 2; Knight of Grace of St. John of Jerusalem, 1; Légion d'Honneur (Croix de Guerre), 1; Croix de Chevalier, 1; Order of the Crown of Italy, 1; Order of St. Anne, 3rd Class (with Swords), 2; Chevalier de l'Ordre de Léopold, 1; Officier de l'Ordre de la Couronne, 1; Medal of St. George (Russian), 1; Order of St. Vladimir (Russian) 1; Order of the White Eagle, 1; Mentioned in Despatches, &c., 110; Commended for services by Secretary of State for War, 10.

St. Mary's.—The completed figures are: Joined, 484. Died, 31. Honours: C.B., 3; C.M.G., 6; M.C., 11; D.S.O., 17; C.V.O., 1; Order of the White Eagle, 4th Class (with Swords) (Serbian), 1; Ordre de la Couronne (conferred by the King of the Belgians), 1; Légion d'Honneur (Croix de Guerre) (conferred by the President of the French Republic), 1; Order of St. Sava, 5th Class (Serbian), 1; Silver Medal for Valour (Italian), 1; Mentioned in Despatches, 73; Promotions for valuable services at home, 12; Wounded, 29; Prisoners of War, 7 (of whom 4 have been exchanged); Missing, 10.

Middlesex.—The completed figures are: Joined, 428. Died, 22. Honours: 29.

St. Thomas's.—The completed list up to August 8th is as follows: Joined, 972. Died, 39. Honours: V.C., 1; K.C.B., 1; K.C.M.G., 2; C.B., 4; C.M.G., 11; M.V.O., 1; D.S.O., 16; M.C., 23; Bar to M.C., 1; Mentioned in Despatches and for valuable service, 101 men, 146 times; Order of the Hospital of St. John of Jerusalem, 3. The foreign honours include: French, 4; Serbian, 4; Belgian, 2; Egyptian, 1.

University College Hospital.—The completed figures are: Joined, 682. Died, 20. Honours: K.C.M.G., 1; C.M.G., 14; C.B., 4; D.S.O. (Bar 1), 10; V.C. (Clasp), 1; Legion of Honour (Croix de Commandeur), 1; Croix de Guerre, 2, Military Cross, 12; First Bar to Military Cross, 3; Second Bar to Military Cross, 1; Mentioned in Despatches (16 twice, 2 three times), 102; Order of the White Eagle, 4th Class, with Swords (Russian), 1; Order of St. Stanislas, 2nd Class, with Swords (Russian), 1.

WAR DRAWINGS.

The publishers of *Country Life* have now issued the first and second parts of War Drawings,[1] executed in France by Lieutenant Muirhead Bone, and destined for the British Museum. Each part will contain reproductions in one, two, or more colours, according to the character of the originals, and the low price has been fixed by the Government so that the publication as a whole, or in the form of separate plates, may have as wide a circulation as possible. Further particulars will be sent on application to the publishers.

Part I. contains, among its ten drawings, several notable pictures, amongst others a sympathetic portrait of Sir Douglas Haig, a view of distant Ypres, and one of the ruins of the famous Cloth-hall, and an admirable drawing of the lovely cathedral at Amiens, round whose flèche the aeroplanes are careering like birds. This picture is reminiscent of Mr. Muirhead Bone's well-known work as an etcher, but public interest will probably centre upon his terrific drawing (Plate 7) of tanks going into action. The centre of the illustration is occupied by an immense tank, jolly and terrible, rolling off on its furious mission, and the plate is sure to become popular for framing.

[1] **War Drawings. By Lieutenant Muirhead Bone. Parts I. and II., price 10s. 6d. each net. The series of six parts in portfolio, £3 3s. net.; separate plates, 2s. 6d. each. 1917. Published by authority of the War Office, from the offices of "Country Life," Limited, 20, Tavistock-street, Covent Garden, London.**

Part II. also contains ten plates, and all the drawings are characterised by the same vigour, love of truth, and sense of the picturesque and dramatic To our mind the most effective drawing in this series is Plate 14, showing the point of the River Somme, near Corbie, in which a wonderful colour effect is got by the use of a bright brown wash shaded with grey on a white ground. Plate 20, "Erecting Aeroplanes," is in a completely different style. Here in the portrayal of the rafters of the workshed and of the numberless pulleys with their running bands, and of the tressels supporting the aeroplanes in construction, Mr. Muirhead Bone has given full play to his love of patterns made by criss-cross lines, a love he so fully displayed in his famous etching of Charing Cross railway station under repair. The drawing is richly tinted and elaborate, though simple, and creates its intended impression of intense activity coupled with business organisation. We recommend these publications to our readers.

BLINDED SOLDIERS' CHILDREN.—Sir Arthur Pearson has issued a letter to the press saying that the success of the work at St. Dunstan's has exceeded his most sanguine hopes. He now feels that everything possible should be done to encourage the bachelor blinded soldiers to marry and surround themselves with children, and also to help those already married with their new babies who may arrive. Joy will be brought into the soldiers' lives, a wife is a practical help to a sightless man, and the Empire will want the sons and daughters. The Government makes a weekly allowance for children born before or within nine months of the soldier's discharge. But there is, of course, no allowance for the children born later or for men who marry after leaving the Army because of their disablement. Sir Arthur Pearson hopes to be able to raise a fund to provide an allowance of 5*s.* per week until the age of 16 for each of these children who are not cared for by the State. The total required, he thinks, will certainly amount to, and may even exceed, £250,000, and he enjoins on readers of this announcement to subscribe themselves and to help in collecting for this fund. To the women of this country he is sure the object will particularly appeal. Requests for information and donations should be sent to Sir Arthur Pearson, 224, Great Portland-street, London, W. 1, the envelope being marked "Blinded Soldiers' Children Fund."

THE IVORY CROSS.—A meeting of those interested in the welfare of the dental profession and the Ivory Cross will be held at 31 and 32, Bedford-street, Strand, W.C., to-day (Saturday, Sept. 22nd), at 3 o'clock prompt, when the memorandum and articles of association passed by the Board of Trade will be presented for the consideration of the dental profession.

BETTER ARTIFICIAL LIMBS FOR SOLDIERS.—Mr. John Hodge, Minister of Pensions, presiding at a dinner held at the Trocadero on Sept. 13th, said that the outstanding ideal before the Pensions Ministry was not the allotment of pensions so much as the restoration to useful citizenship of mutilated, wounded, and suffering men. Wherever possible an endeavour would be made to restore men to the full use of their limbs, and he was seeking money from the Treasury for the purpose of starting a National Experimental Laboratory where we might get as near as possible to perfection in artificial limbs. He desired to call to his aid the greatest skill and the greatest inventive faculty that the country possessed in order to get the best artificial limb possible. In conclusion, he paid a high tribute to the medical profession, the greatness of whose work, he said, in the direction of restoration was beyond conception. Incidentally, he mentioned that there were 900,000 pensioners on the books of his Department, and that this number was being increased by hundreds every week.

At a private deputation on Sept. 17th from the Roehampton Hospital Committee regarding the proposal to establish a National Experimental Laboratory for the purpose of designing and controlling the manufacture of artificial limbs for disab'ed soldiers, Mr. Hodge reiterated his intention of taking immediate steps to seek the necessary funds for the establishment of a National Experimental Laboratory which might ultimately become a national factory for manufacturing limbs. For the present he was opposed to the establishment of a national factory. It was essential that the committee of management of the National Laboratory should be small, representative of surgeons and mechanical experts, and distinct from any committee managing hospitals for limbless men. The laboratory committee would be directly responsible to the Ministry of Pensions.

"WHAT EVERY SOLDIER SHOULD KNOW."—Some months ago the Military Hospitals Commission of Canada issued a poster giving information to the disabled soldier in regard to the possibilities of earning his own living, and setting out exactly what is being done for him in the way of pensions and the free supply of artificial limbs. Under the title "What Every Soldier Should Know," this information is now being reprinted on a card about the size of a court-shaped envelope, and the cards are being widely distributed. A leaflet for civilians as well as soldiers is also being circulated in the form of a conversation with Private Pat, who says: "I'll take whatever pension my old leg's worth, but blamed if I want to *live* on one, and *rust* away the rest of my life. I want to be a man again as I was before, and make my own living, not sponge on other people. ..... How's it going to be done? Tell me all about it." Card and leaflet answer the question for him and for the employer. The spread of information of this kind must be exceedingly useful, for it is not fully realised that with modern scientific training and appliances a large number of maimed soldiers may become self-supporting members of society. Copies of both card and leaflet can be obtained in the United Kingdom from Canadian Red Cross representatives and at all hospitals where Canadian soldiers are undergoing treatment.

"THE LEAGUE OF MERCY."—A War Bazaar is to be held at the Ritz Hotel, Piccadilly, on Oct. 24th and 25th next, to augment much-needed funds for the general hospitals which are daily nursing back to health many poor patients as well as our wounded brave sailors and soldiers and victims of the air raids. The bazaar is being organised by the presidents and lady presidents of certain districts of "The League of Mercy." All information can be had of the League of Mercy offices, 29, Southampton-street, Strand, or the honorary organising secretaries, Mr. W. and Miss Andrews, 5, Belsize-park, Hampstead.

AMERICAN WOMEN'S WAR HOSPITAL, PAIGNTON, SOUTH DEVON.—An analysed report of the fourth thousand cases treated at this hospital has been issued by Dr. D. Pearce Penhallow, Major in the Medical Reserve Corps, United States Army, chief surgeon to the hospital, and its administrative officer. There were in the hospital on August 19th, 1916, 202 patients. Up to May 20th, 1917, 982 more were received, totalling 1184 received; but on May 29th, 1917, there remained in the hospital only 184 cases, a thousand having been discharged as follows: For invaliding, 52; transferred for special treatment to various hospitals, 147; transferred to convalescent hospitals (mainly the Larches V.A.D. Hospital, Paignton, and Totnes V.A.D. Hospital), 559; discharged to furlough, 238; and died, 4. The average time in the hospital for the total 1000 discharged was 50 days. There was a total of surgical cases of 650 (487 traumatic and 163 non-traumatic); and a total of medical cases of 350 (infectious, 124; non-infectious, 220; diseases of the eye, 4; diseases of the skin, 11; epididymitis, 1; totalling 360, but minus 10 medical complications of surgical cases). The results of the treatment of 650 surgical cases were as follows: Cured, 395; improved, 243; unimproved, 10; died, 2 (shrapnel wound of skull and cerebral abscess one and gunshot wound of chest and pulmonary embolism the other). The results in the 350 medical cases were as follows: Cured, 120; improved, 220; unimproved, 8; died, 2 (cerebro-spinal meningitis one and nephritis the other). The operations before admission numbered 270 and after admission 263, 2 refusing operations. The location of the injuries predominated in order as follows: Thigh, lower leg, upper arm, shoulder, back, forearm, hand, buttocks, foot, knee, face. (These did not include a total of 163 fractures, classified as follows: head, 15; trunk, 25; upper extremity, 63; lower extremity, 60.) The cause of the injuries was: Shell, 371; bullet, 125; shrapnel, 36; grenade, 25. Under the heading of Complications of Wounds—infections—are following numbers: Pyogenic, 283; gas bacillus, 15; tetanus, 1. The eight small pages of the report contain the statistical results of a large amount of good work.

Medical News.

THE WELFARE OF INFANCY.—From Oct. 1st to Dec. 17th, on Mondays, from 5.30 to 6.30 P.M., a course of elementary lectures on infant care for mothers, teachers, infant-welfare workers, and others will be held at 1, Wimpole-street, W., under the auspices of the National Association for the Prevention of Infant Mortality. The lecturers include Mr. C. F. P. Baly, Lady Barrett, Mr. E. A. Barton, Dr. Mildred Burgess, Dr. S. Gilford, Dr. W. J. Howarth, Mr. H. R. Jeremy, Dr. Eric Pritchard, Dr. Flora Shepherd, and Mr. Hunter F. Tod. The fee for the whole course of 12 lectures will be 5s., and for a single lecture 1s. For tickets, which must be obtained in advance, application should be made to Miss Halford, Secretary, National Association for the Prevention of Infant Mortality, 4, Tavistock-square, London, W.C.

CERTIFICATES AS TO THE EYESIGHT AND HEARING OF "FIREMEN, EXAMINERS, OR DEPUTIES" EMPLOYED IN MINES UNDER THE COAL MINES ACT.—The Home Secretary desires to draw the attention of medical practitioners in colliery districts and elsewhere to the provision in Section 15 (1) (c) of the Coal Mines Act, 1911, which requires that a person holding a certificate of qualification as a fireman, examiner, or deputy must subsequently, so long as he continues to be employed as a fireman, examiner, or deputy, obtain every five years from a school, institution, or authority approved by the Secretary of State, or from a duly qualified medical practitioner, a fresh certificate in the prescribed form to the effect that his eyesight is such as to enable him to make accurate tests for inflammable gas and that his hearing is such as to enable him to carry out his duties efficiently.

THE LATE MR. ARTHUR BADCOCK.—The death of Mr. Arthur Badcock, of York, occurred on Sept. 16th, suddenly, though it was preceded by an illness of some months' duration. Mr. Badcock was the son of the late Rev. J. Badcock, D.C.L., vicar of Stroud, and after completing his studies at the Leeds School of Medicine was appointed resident medical officer to the York Dispensary. Subsequently he settled in practice in York, and became honorary medical officer to the Dispensary, of which for some years he has been senior honorary officer. He took a keen interest in its management and in all professional matters in the city, and from July, 1914-1917, was President of the York Medical Society. He was held in high esteem by his medical colleagues and by a wide circle of friends and patients.

THE MEDICAL DEFENCE UNION.—At the annual general meeting of the Medical Defence Union the chair was taken by the President, Sir John Tweedy, who was re-elected President for the ensuing year. We have received a copy of the report of the council, which, as usual, forms interesting reading and testifies to the valuable work carried on by the Union, although that work has been beset by many difficulties owing to the continuance of the war. Hundreds of members have had to claim urgent advice in respect of their "joining up," owing to the consequent dislocation of medical practice, insurance and partnership agreements. A great deal of extra work has thus been cast upon the Executive, and legal questions arising out of the war and the mobilisation of medical practitioners have had to be dealt with. Letters asking advice have been received from members on active service from almost every part of the war arenas, and it has naturally been a great satisfaction to the council—a condition of affairs upon which they may be congratulated—to know that, although thousands of miles may lie between their members and the Executive of the Union, yet, when in doubt or difficulty, the members naturally turn to the Union for help, advice, or assistance. Certain claims by civilian medical officers for taking medical charge of troops in the absence of a military medical officer, which were held up or resisted by the Army authorities for various reasons, were placed in the hands of the Union, and in every case satisfactory settlements were completed in the course of time. The illegal assumption of Army medical rank, and even the holding of commissions as such by unqualified persons, have been dealt with, and in each case every assistance has been given to the satisfaction of the public authorities in connexion with these cases, where the prior history of the suspect was in the possession of the Executive. As in former reports, many cases are recorded with which the Union have had to deal during the year, and they all demonstrate the benefits received by those who are members of the Union. The solicitor's report also bears the impress of the war, for approximately one-third of the 319 cases referred to him during the past two years had relation to the solution of partnership questions and the adjustment of matters arising out of appointments, whilst an equal number concerned questions arising under the National Insurance Act. The respect in which the Union is held by those inclined to favour and support litigation of a speculative character has never been more clearly evidenced, and we congratulate the general secretary, Dr. A. G. Bateman, and the solicitor, Mr. W. E. Hempson, on a successful year's work.

THE BIRTHDAY HONOURS.—Among the recipients of the Kaisar-i-Hind gold medal of the first-class (see Birthday Honours published in THE LANCET of June 9th, p. 885) the name of Lieutenant-Colonel K. Prasad, I.M.S., should have been included.

WEST LONDON MEDICO-CHIRURGICAL SOCIETY.—The opening meeting of the session will be held on Friday, Oct. 5th, at the West London Hospital. Dr. A. J. Rice-Oxley, the newly elected President, will deliver an address on Medical Men as Portrayed in English Literature.

THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN.—The opening of the seventy-sixth session of the School of Pharmacy will take place on Wednesday afternoon, Oct. 3rd, when the Hanbury gold medal will be presented by the President to Professor H. G. Greenish, and the inaugural sessional address will be delivered by Lieutenant-Colonel E. F. Harrison, C.M.G.

OFFICIAL DRAWINGS OF ADMIRALS AND GENERALS.—Some months ago Mr. Francis Dodd, the well-known portrait painter and etcher, was given special facilities to obtain sittings from distinguished leaders in the Navy and Army. Mr. Dodd has completed many drawings and arrangements have been made to publish reproductions of them, with appropriate letterpress. The first series will be issued shortly under the title of "Generals of the British Army."

MEDICAL OFFICERS' SALARIES.—The health committee of the South Shields Corporation dealt with an application from Dr. D. Morley Mathieson to consider the terms of his appointment as medical officer of health for the borough. The committee obtained a summary of the salaries paid to medical officers in 17 towns ranging from 75,000 inhabitants to the size of South Shields (97,000), and this showed the average salary to be £686 per annum. In these circumstances the committee recommends that Dr. Mathieson's salary should be increased from £500 to £600.

THE MEANING OF AMNESTY.—The case of Mr. Richard Hayes, formerly dispensary doctor at Rush and Lusk, co. Dublin, has provoked in Ireland questions as to the meaning of amnesty. Having taken part in the Sinn Fein rebellion, he was detained in England until at the granting of the general amnesty he was allowed to return to Ireland with others in like position. He applied for re-appointment to his dispensary, which had remained without a medical officer during his absence, was reinstated by the board of guardians, and took up his work again. Three weeks later an intimation was received from the Local Government Board in Ireland to the effect that the Board was unable to ratify his appointment because he had not yet received free pardon from the Crown.

URBAN VITAL STATISTICS.

(Week ended Sept. 15th, 1917.)

English and Welsh Towns.—In the 96 English and Welsh towns, with an aggregate civil population estimated at nearly 17,000,000 persons, the annual rate of mortality was 10·6, against 10·6 and 11·1 per 1000 in the two preceding weeks. In London, with a population exceeding 4,000,000 persons, the death-rate was 9·8, or 2·1 per 1000 below that recorded in the previous week; among the remaining towns the death-rates ranged from 5·0 in Barrow-in-Furness, 5·1 in Bath, and 5·6 in Ealing to 17·2 in South Shields, 19·9 in Carlisle, and 20·9 in Stockton-on-Tees. The principal epidemic diseases caused 351 deaths, which corresponded to an annual rate of 1·1 per 1000, and included 262 from infantile diarrhœa, 39 from whooping-cough, 22 from diphtheria, 18 from measles, 6 from scarlet fever, and 4 from enteric fever. The deaths from diarrhœa, which had steadily increased from 53 to 320 in the eight preceding weeks, fell to 262, and included 68 in London, 21 in Liverpool, 15 each in Manchester and Leeds, and 13 in Birmingham. The 683 cases of scarlet fever and 1037 of diphtheria under treatment in the Metropolitan Asylums Hospitals and the London Fever Hospital were respectively 31 above and 4 below the numbers remaining at the end of the previous week. Of the deaths from all causes in the 96 towns, 139 resulted from violence. The causes of 32 deaths were uncertified, of which 8 were registered in Birmingham, 5 in Liverpool, and 3 each in Stoke-on-Trent and West Bromwich, but not one in London.

Scotch Towns.—The 246 deaths from all causes in Glasgow corresponded to an annual rate of 11·5 per 1000, and included 15 from infantile diarrhœa, 11 from whooping-cough, 2 from diphtheria, and 1 each from measles and scarlet fever. The 70 deaths in Edinburgh were equal to a rate of 11·0 per 1000, and included 1 death each from measles, whooping-cough, diphtheria, and diarrhœa.

Irish Towns.—The 115 deaths in Dublin corresponded to an annual rate of 15·0, or 2·9 per 1000 less than that recorded in the previous week, and included 20 from infantile diarrhœa, 2 from diphtheria, and 1 from enteric fever. The 91 deaths in Belfast were equal to a rate of 12·1 per 1000, and included 7 from infantile diarrhœa.

Appointments.

Successful applicants for vacancies, Secretaries of Public Institutions, and others possessing information suitable for this column, are invited to forward to THE LANCET Office, directed to the Sub-Editor, not later than 9 o'clock on the Thursday morning of each week, such information for gratuitous publication.

GIBI, D. V., L.R.C.P. & S. Edin., D.P.H. Lond., D.O. Oxon., has been appointed Ophthalmic Surgeon to the Eastbourne Eye Infirmary.

MITCHELL, T. CARTER, M.R.C.S., L.R.C.P. Lond., Medical Officer of Health for the Wath Rural Council.

Vacancies.

For further information regarding each vacancy reference should be made to the advertisement (see Index).
When the application of a Belgian medical man would be considered the advertisers are requested to communicate with the Editor.

BIRKENHEAD BOROUGH HOSPITAL.—Junior House Surgeon. Salary £175 per annum, with board, &c.

BIRMINGHAM, LITTLE BROMWICH FEVER HOSPITAL.—Female Assistant Medical Officer. Salary £300 per annum, with board, &c.

BIRMINGHAM (NEAR), ROMSLEY HILL SANATORIUM.—Temporary Medical Superintendent. Salary £400 per annum, with board, &c.

BRIGHTON, ROYAL ALEXANDRA HOSPITAL FOR SICK CHILDREN, Dyke-road.—House Surgeon. Salary £200 per annum, with board, &c.

BRISTOL ROYAL INFIRMARY.—House Physician and House Surgeon. Salary at rate of £120 per annum, with board, &c.

BURY INFIRMARY.—Junior House Surgeon. Salary £150 per annum, with board, &c.

COLMONELL PARISH, LOWER DISTRICT OF.—Medical Officer. Salary £70 per annum.

DERBY, DERBYSHIRE ROYAL INFIRMARY.—House Physician and Casualty Officer. Salary £200 per annum, with board, &c.

DUDLEY, GUEST HOSPITAL.—Senior Resident Medical Officer. Salary £150 per annum, with board, &c. Also Assistant House Surgeon. Salary £120 per annum, with board, &c.

FAREHAM, HANTS COUNTY ASYLUM.—Temporary Assistant Medical Officer. Salary 7 guineas a week, with board, &c.

GENERAL LYING-IN HOSPITAL York-road, Lambeth.—Resident Medical Officer for three months. Salary £100 per annum, with board.

GLAMORGAN COUNTY ASYLUM, Bridgend.—Temporary Assistant Medical Officer. Salary £6 6s. per week, with board, &c.

HOSPITAL FOR CONSUMPTION AND DISEASES OF THE CHEST, Brompton.—House Physician for six months. Salary 30 guineas.

IPSWICH, AUXILIARY HOSPITAL FOR WOUNDED, Lattice Barn.—House Physician. Salary as arranged, with board, &c.

LEEDS PUBLIC DISPENSARY.—Resident Medical Officer. Salary £200 per annum, with board, &c.

LINDSEY (LINCOLNSHIRE), COUNTY OF THE PARTS OF.—Assistant Medical Officer. Salary £350 per annum.

LONDON COUNTY ASYLUM, Bexley, Kent.—Temporary Assistant Medical Officer. Salary 6 guineas per week, with board, &c.

LONDON THROAT HOSPITAL, 204, Great Portland-street, W.—House Surgeon. Salary £75 per annum.

MANCHESTER EDUCATION COMMITTEE.—Female Assistant School Medical Officer, unmarried. Salary £300 per annum.

NOTTINGHAM GENERAL HOSPITAL.—Female House Surgeon for six months. Salary at rate of £250 per annum, with board, &c.

NOTTINGHAM AND MIDLAND EYE INFIRMARY.—Female House Surgeon. Salary £200 to £250 per annum, with board, &c.

PORTSMOUTH, ROYAL PORTSMOUTH HOSPITAL.—House Surgeon for six months. Salary £250 per annum, with board, &c.

PRINCE OF WALES'S GENERAL HOSPITAL, Tottenham, N.—Honorary Anæsthetist once a week. Salary £20 per annum.

QUEEN'S HOSPITAL FOR CHILDREN, Hackney-road, Bethnal Green, E.—House Physician for six months. Salary £100 per annum, with board, &c. Also Temporary Assistant Physicians for Monday afternoons and Saturday mornings. Salary at rate of £25 per annum, with lunch.

ROTHERHAM HOSPITAL.—Junior House Surgeon. Salary £150, with board, &c.

ROYAL BERKSHIRE HOSPITAL.—Senior Resident Medical Officer. Salary £350 per annum, with board, &c. Also House Surgeon for six months. Salary at rate of £250 per annum, with board, &c. Also Second House Surgeon for six months. Salary at rate of £200 per annum if qualified (if unqualified £150), with board, &c.

ST. HELENS COUNTY BOROUGH.—Temporary Assistant Medical Officer of Health. Salary £350 per annum.

SALISBURY GENERAL INFIRMARY.—House Surgeon. Salary £150 per annum, with board, &c.

SCOTTISH WOMEN'S HOSPITALS.—Female Radiographers for Units in Greece. Salary £300 per annum, with uniform, board, &c.

SHEFFIELD ROYAL INFIRMARY.—Two House Surgeons. Salary £120 per annum, with board, &c.

SOUTHAMPTON, FREE EYE HOSPITAL.—House Surgeon. Salary £100 per annum, with board, &c.

SOUTHAMPTON, ROYAL SOUTH HANTS AND SOUTHAMPTON HOSPITAL.—House Physician.

SOUTH LONDON HOSPITAL FOR WOMEN, South Side, Clapham Common, S.W.—Female House Physician and House Surgeon for six months. Salaries at rate of £100 per annum each, with board, &c. Also Anæsthetists for Monday and Tuesday afternoons and Tuesday and Friday mornings. Salary 10s. 6d. per attendance.

SWINDON, G.W.R. MEDICAL FUND SOCIETY.—Medical Officer. Salary £500 per annum.

WEST BROMWICH DISTRICT HOSPITAL.—Senior House Surgeon, unmarried. Salary £160 per annum, with board, &c.

WESTMORLAND, LANCASHIRE, AND CHESHIRE COUNTIES.—Medical Practitioners to serve on Medical Boards for examination of, and assessment of pensions for, men discharged from the Army for Neurasthenia and Functional Nervous Disorders. Salary 3 guineas per day.

Births, Marriages, and Deaths.

BIRTHS.

ALDIS.—On Sept. 13th, at Norton House, King's avenue, Clapham Park, the wife of Carlyle Aldis, Captain, R.A.M.C., of a son.

GOFFE.—On Sept. 15th, at a nursing home in London, the wife (*née* Edna Mary Powell, M.B., B.S. Lond.) of E. G. Leopold Goffe, M.D., B.S. Lond., of a son.

GUTHRIE.—On Sept. 13th, at Greta, Heswall, Cheshire, the wife of Thomas Guthrie, M.B., F.R.C.S., of Rodney-street, Liverpool, of a son.

REYNELL.—On Sept. 12th, at New Cavendish-street, W., to Dr. and Mrs. W. B. Reynell—a son.

RICHMOND.—On Sept. 10th, at Alexandria, the wife of Captain Arthur E. Richmond, R.A.M.C., of a son.

TAYLER.—On Sept. 13th, at Lovemead House, Trowbridge, the wife of F. E. Tayler, M.R.C.S., of a son.

MARRIAGES.

DALE—CROSSLAND.—On Sept. 11th, Captain Aston Ridley Dale, M.C., R.A.M.C. (S.R.), to Janet (Jennie) Wemyss, second daughter of the late Lewis Crossland and Mrs. Crossland, of Leeds.

HARVIE—METFORD.—On Sept. 12th, at the Parish Church, Kingsdown, Deal, Montague Harvie, R.A.M.C., to Dorothy Isabel, only daughter of Mr. and Mrs. E. Seymour Metford, of Kingsdown.

HUMPHRY—PURVIS.—On Sept. 14th, by special licence, Alexander Murchison Humphry (temp. Major, R.A.M.C.), to Vida, youngest daughter of Mr. and Mrs. David Purvis, Knockdown Park, Belfast.

MEAKIN—GASCOIGNE.—On Sept. 15th, at St. Mary's, Tansor, Northants, Captain Leslie Meakin, R.A.M.C., to Honor, youngest daughter of the Rev. W. B. Gascoigne, M.A., rector of Tansor, and Mrs. Gascoigne.

MOODIE—COCHRANE.—On Sept. 12th, at the Station Hotel, Perth, Alexander Reid Moodie, Captain, R.A.M.C. (T.), to Emily (Queenie), younger daughter of Andrew Cochrane, of Craigisla, Alyth.

RADFORD—LLOYD.—On Sept. 15th, at Hampstead, Maitland Radford, M.B., B.S., son of Mr. and Mrs. Ernest Radford, of 32, Well Walk, Hampstead, N.W., to Muriel Ann Lloyd, M.B., B.S., D.P.H., second daughter of Dr. and Mrs. Henry Lloyd, of Arsylfa, St. Asaph, North Wales.

DEATHS.

BADCOCK.—On Sept. 16th, at Clarence House, York, Arthur Badcock, M.R.C.S., L.R.C.P., aged 55 years.

FRANKLING.—On Sept. 14th, 1917, at 19, York-road, Harrogate, Florence (*née* Ashmall), wife of Herbert Frankling. Was interred at Harlow Cemetery, Wednesday, Sept. 19th.

N.B.—A fee of 5s. is charged for the insertion of Notices of Births, Marriages, and Deaths.

BOOKS, ETC., RECEIVED.

ALLEN, GEORGE, AND UNWIN, LIMITED.
Three Clinical Studies in Tuberculous Predisposition. By W. C. Rivers, M.R.C.S., L.R.C.P., D.P.H. 12s. 6d. net.
"I Appeal Unto Cæsar." By Mrs. H. Hobhouse. With Introduction by Professor Gilbert Murray. 1s. net.

BAILLIÈRE, TINDALL, AND COX, London.
The Thyroid Gland in Health and Disease. By Robert McCarrison, M.D. R.U.I., D.Sc. Belf., F.R.C.P. Lond., Lauréat de l'Académie de Médecine, Paris, Major, I.M.S. 12s. 6d.

BLACK, A. AND C., London.
An Introduction to the Physiology and Psychology of Sex. By S. Herbert, M.D., M.R.C.S., L.R.C.P. 3s. 6d. net.

BLACKIE AND SON, London.
Health of Working Girls: A Handbook for Welfare Supervisors and Others. By Beatrice Webb, M.D., Ch.B. 2s. 6d. net.

CASSELL AND CO., London, New York, Toronto, and Melbourne.
Diseases of the Skin. An Outline of the Principles and Practice of Dermatology. By Sir Malcolm Morris, K.C.V.O. 12s. net.

CONSTABLE AND CO., LTD., London.
Health in Camp. By A. T. Nankivell, M.D., Captain, R.A.M.C. 1s. net.
The Theory and Use of Indicators. An Account of the Chemical Equilibria of Acids, Alkalies, and Indicators in Aqueous Solution, with Applications. By E. B. R. Prideaux, M.A., D.Sc., Lecturer in Chemistry, University College, Nottingham. 12s. 6d. net.

HEINEMANN, WILLIAM, London.
Practitioner's Pocket Pharmacology and Formulary. By L. Freyberger, J.P., M.D. Vienna, M.R.C.P. Lond., M.R.C.S. Eng., Barrister-at-Law. 12s. 6d. net.
Emergency Surgery. By John W. Sluss, A.M., M.D., F.A.C.S., Associate Professor of Surgery, Indiana University School. Fourth edition. 17s. 6d. net.
Studies in Forensic Psychiatry. By Bernard Glueck, M.D., Instructor in Psychiatry and Neurology in the Medical Departments of George Washington and Georgetown Universities. 10s. 6d. net.

The following journals, magazines, &c., have been received:—Journal of Physiology, Journal of State Medicine, British Dental Journal, Medical Journal of South Africa, Tropical Diseases Bulletin, Revue d'Hygiène, Homœopathic Recorder, Asylum News, Archives of Internal Medicine, Dominion Medical Monthly, Canadian Journal of Medicine and Surgery, Office International d'Hygiène Publique, American Journal of Public Health, Anales de la Facultad de Medicina, Universidad de Montevideo, Duodecim, Midland Medical Journal, Symons's Meteorological Magazine, Canadian Medical Association Journal, Medical Officer, Journal of Nervous and Mental Diseases, Annali d'Igiène, Therapeutic Gazette, Indian Medical Gazette, National Medical Journal, &c.

Notes, Short Comments, and Answers to Correspondents.

SACCHARIN.

THE question of the harmfulness or otherwise of saccharin has recently been raised anew. In THE LANCET of Nov. 17th, 1888, we published a long letter from Dr. C. Fahlberg, who, after describing himself as the discoverer of saccharin, said that—

"If saccharin could be proved injurious to man I would ask your readers to accept my assurance that I would not be responsible for the manufacture of another ounce."

At the end of his letter he says:—

"The attacks upon saccharin have sorely disquieted the public mind. If they are merited the anxiety is justified. If not, it will unfairly prejudice my discovery, which, after all, will confer as much benefit upon humanity as upon myself. In this spirit I ask your readers no longer to observe that silence which in most cases, but not in this, is both dignified and necessary. It is no question of advertisement. I have been grievously attacked, and I plead for justice."

In the same issue of THE LANCET we published an article by Dr. Thomas Stevenson and Dr. L. C. Wooldridge, giving the results of scientific experiments made by them with saccharin. Their summary is as follows:—

"We conclude that: (1) saccharin is quite innocuous when taken in quantities largely exceeding what would be taken in any ordinary dietary; (2) saccharin does not interfere with or impede the digestive processes when taken in any practicable quantity; and (3) our personal experience is that saccharin may be taken for an extended period without interfering with the digestive and other bodily functions. Hence there is no reason to think that its continued use is in any way harmful."

Dr. F. W. Pavy wrote a letter to THE LANCET of Nov. 3rd, 1888, saying that—

"A scare has been started against saccharin upon the ground of hurtful effects having been observed to follow its employment, and I have been falsely represented as participating in this assertion. Under such circumstances, to remain silent would give sanction to the statements that have been circulated."

This followed an annotation in THE LANCET, reporting that several paragraphs had appeared in various journals referring to the report of a commission of Paris doctors and their adverse verdict. The conclusions of this commission were communicated to the Academy of Medicine in Paris in July, 1888. It was a communication made to the same academy by Dr. Jules Worms on the subject of saccharin early in 1888 (reported in THE LANCET of May 5th, 1888) which caused the Prefect of Police of Paris to request the Council of Hygiene to give its opinion as to whether the use of this substance in alimentation would be productive of danger to the public health. In England in 1888 an order was issued prohibiting its use in brewing, and from time to time in various countries it has been considered as an "adulteration." In the beginning of 1912 a United States Government Board decided against the use of saccharin because its use instead of sugar in preserved foods meant that they therefore contained less food value, saccharin lacking the nutriment of the sugar. This was reported in THE LANCET of March 23rd, 1912. A few cases have been reported where saccharin apparently caused stomach pain and neuralgia and other discomforts, but there is no great amount of evidence at hand as to its harmfulness when compared with the testimonials as to its benefits.

A SPECIALIST IN ELECTRO-THERAPY.

WE have received from a correspondent a communication entitled "re A. Vernon-Ward (Consolidated) Limited," enclosed within which is an application form for cumulative preference shares in a company of that name. The document states that there is an insistent demand for the Vernon-Ward treatment in various parts of the country, and in a "brief résumé of the work already accomplished" adds that "treatments have been administered with signal success to Royalty, members of the Peerage, and a large number of naval and military officers and men," and also that "Mr. Vernon-Ward enjoys the coöperation and support of the cream of the medical profession in this country." It is further stated that the goodwill of the undertaking, "created by advertising in the press to the extent of some £25,000," has made necessary the formation of the company. We recommend any of our readers, including that cream of the medical profession alluded to in the circular communication, to suggest to those of their patients who may receive invitations to become shareholders in A. Vernon-Ward (Consolidated) Limited, that before applying for shares and making deposits on their applications, they should take the usual course of examining the security offered, and they might also ascertain who are the medical authorities whose supervision would be required to give scientific stability to any undertaking of the sort.

HEARSON'S INCUBATORS.

THE new list which Messrs. Chas. Hearson and Co., Ltd. (235, Regent-street, W. 1), have issued contains a large number of thermostats available for a variety of purposes, all of them regulated by means of the sensitive hollow capsule which renders possible the attainment of a temperature constant within 1° F. over an indefinite period of time without adjustment. Apart from this invention, the utility of which has been assured by experience in important laboratories all over the world, a new electric incubator is listed in which the usual water-jacket is replaced by coils of electric resistance wires. Naturally, with this method of heating the requisite interior temperature is rapidly reached; it is also more economical of heat, since it admits of a thicker layer of heat-insulating material without unduly increasing the size of the apparatus. It is claimed that the same system of heating is equally applicable to drying ovens and sterilisers. With a view of making the apparatus available for all countries, the list contains a preface in English, German, French, Spanish, and Russian, as well as a key in each language to every description of apparatus. Besides thermostats, other large laboratory apparatus, such as shaking machines, centrifuges, and autoclaves, are included, and for the assistance of the novice a list of apparatus and materials suitable for the equipment of a small laboratory. The list will repay careful study.

ATTITUDES IN READING.

THE posture of the body in writing has received for many years a large amount of attention from parents, schoolmasters, scientific observers, and medical men, but not so much attention has been paid to the posture of the body in reading. In these days of many wounded men the posture of the body in reading should receive more attention. The disposition of the trunk, head, and neck, and the arrangement of the limbs must have considerable influence for good or evil, particularly when the body and limbs are maintained in one position for hours at a stretch. Especially is this the case when reading a book of absorbing interest, where the reader "gets lost" for a long time, all his attention being concentrated on what he reads. Eventually he wakes up as it were from a dream in a state of rigidity and tension, to find his neck aching and his body stiff and an arm or leg all tingling with "pins and needles."

The attitudes of readers vary considerably. Some will sit straight upright, some will lean back, and others will lean forward, propping the forearms across the thighs, or place the chin in the right hand and lean the elbow on the thigh. If sitting on a chair some will lean forward, placing the hands behind and hanging on to the back of the chair like a fruit-bat. If sitting on an armchair some will lean for a long spell over the left arm of the chair and others over the right arm of the chair, making the ribs ache. Not a few will dig their chins into their chests and curve their bodies into the form of a note of interrogation. Such an attitude maintained for a length of time is most injurious. As regards the manner of holding the book, some are "chin readers" and others "lap readers," and the book is held so that the page is at all angles. The page may lie horizontally or have a dip at top or bottom or be held almost perpendicularly whilst reading, the condition, of eyesight generally dictating the pose. This should not be lost sight of by parents, and it is often quite useful to the practitioner to have seen his patient, especially his youthful patient, reading.

Medical Diary for the ensuing Week.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

POST-GRADUATE COLLEGE, West London Hospital, Hammersmith-road, W.

MONDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray Operations. Mr. B. Harman: Diseases of the Eye. Dr. Simson: Diseases of Women.

TUESDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.

WEDNESDAY.—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations.

THURSDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye.

FRIDAY.—10 A.M., Dr. Simson: Gynæcological Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.

SATURDAY.—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. Mr. B. Harman: Eye Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations.

THE THROAT HOSPITAL, Golden-square, W.

MONDAY.—5.15 P.M., Special Demonstration of Selected Cases.

THURSDAY.—5.15 P.M., Clinical Lecture.

EDITORIAL NOTICES.

IT is most important that communications relating to the Editorial business of THE LANCET should be addressed *exclusively* "TO THE EDITOR," and not in any case to any gentleman who may be supposed to be connected with the Editorial staff. It is urgently necessary that attention should be given to this notice.

It is especially requested that early intelligence of local events having a medical interest, or which it is desirable to bring under the notice of the profession, may be sent direct to this office.

Lectures, original articles, and reports should be written on one side of the paper only, *and when accompanied by blocks it is requested that the name of the author, and if possible of the article, should be written on the blocks to facilitate identification.*

Letters, whether intended for insertion or for private information, must be authenticated by the names and addresses of their writers—not necessarily for publication.

We cannot undertake to return MSS. not used.

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Subscribers abroad are particularly requested to note the rates of subscriptions given on page 6.

The Manager will be pleased to forward copies direct from the Offices to places abroad at the rates shown, whatever be the weight of any of the copies so supplied.

METEOROLOGICAL READINGS.

(Taken daily at 8.30 a.m. by Steward's Instruments.)

THE LANCET Office, Sept. 19th, 1917.

Date.	Rainfall.	Solar Radio in Vacuo.	Maximum Temp. Shade.	Min. Temp.	Wet Bulb.	Dry Bulb.	Remarks.
Sept. 13	...	86	65	51	54	57	Overcast
,, 14	...	110	71	55	56	60	Fine
,, 15	...	106	71	54	53	58	Fine
,, 16	...	107	71	56	58	62	Fine
,, 17	...	105	68	58	56	62	Fine
,, 18	0·32	96	66	60	61	62	Raining
,, 19	0·15	78	65	60	63	64	Raining

Other information which we have been accustomed to give in these "Readings" is withheld for the period of the war.

Communications, Letters, &c., have been received from—

A.—Mr. R. Ackrill, Harrogate; Anglo-French Drug Co., Lond.; Messrs. Allen and Hanburys, Lond.; Dr. F. S. Arnold; Capt. C. H. Attenborough, R.A.M.C.; Capt. J. L. Aymard, R.A.M.C.; Mr. H. W. Abbott, Lond.; Messrs. Arnold and Sons, Lond.; Capt. R. W. Allen, N.Z.M.C.; Miss L. B. Aldrich-Blake, M.D., Lond.; Col. J. G. Adami, A.D.M.S.

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Letters, each with enclosure, are also acknowledged from—

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